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THE SURPLUS PROBLEM IN THE NORTHEASTERN MILKSHEDS

By

Leland Spencer

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Farm Credit Administration, Cooperative Division, Washington, D. C.

In Cooperation With

New York State College of Agriculture, and Pennsylvania State College

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By
Leland Spencer,
Professor of Marketing,
New York State College of Agriculture 1/

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SUMMARY

The surplus problem is present in any market wherein there is a marked distinction in quality and price between the milk used for consumption in fluid form and that used in the manufacture of butter, cheese, and other less perishable products. At the request of the National Cooperative Milk Producers Federation, a study of the surplus milk supply in the Northeastern States was undertaken. The following are some of the more important preliminary findings of this study:

The definition of surplus milk varies according to conditions in different markets. In general it is that part of the supply available for sale in a given market or group of markets, in excess of the quantity required for consumption in fluid form or for other uses that must be supplied throughout the year from the same sources as the fluid milk.

The 11 Northeastern States from Maine to Maryland, and the District of Columbia, contain 6 percent of the farm area of the United States, produce 17 percent of the total milk supply, and have 40 percent of the urban population.

The cows kept in this area provide enough milk during the short season to take care of the demand for fluid milk and a major part of the demand for cream, ice cream, and cream cheese. The total consumption of dairy products, in terms of milk equivalent, by the people of this area, however, is nearly double the local production. The remainder of the supply is imported either as cream or as manufactured dairy products from States further west.

On a yearly basis, about one-sixth of the total supply of milk and cream for this area was consumed or manufactured into butter on the farms where produced. Of the milk and cream sold from the farms, just about 80 percent was used as fluid milk and cream, and about 20 percent in manufactured products.

From 1929 to 1934, there was little change in the total quantity of milk used for manufacture. A decrease in ice cream production was offset by larger production of creamery butter. Decreases in dairy products manufactured in several of the other States were offset by increases in New York and Pennsylvania.

About half the manufactured milk went into the more perishable products such as ice cream, cream cheese, and milk chocolate, in the production of which the localities near large consuming centers have a great advantage. The other half of the manufactured milk went into the less perishable products like butter, cheese, and evaporated milk, which can be produced wherever cheap milk is available in sufficient quantities.

The supply of milk and cream in the Northeastern area varied much more, according to the season, than did the consumption of fluid milk and cream. The surplus available for manufacture amounted to 27 percent of the entire supply in June, but only 13 percent in November.

The output of most of the manufactured dairy products varies with the excess of milk production over fluid-milk and cream requirements, which are normally greatest in May and June. The production of ice cream and cream cheese follows the demand. Ice cream production reaches a high peak in July and August, while the output of cream cheese is somewhat greater through the winter than in summer.

In Massachusetts, Connecticut, Rhode Island, New Jersey, and the District of Columbia, the consumption of fluid milk and cream was greater than the production, and substantial quantities were shipped in from adjacent States and from the West. In the other seven States of the region, and in Vermont particularly, more milk was produced than was needed for consumption as fluid milk and cream, and substantial quantities were supplied to markets in the deficit States. Vermont shipments to Boston and to other outside markets amounted to two-thirds of the total production in the State.

In the Northeastern States are six primary markets or groups of markets, each having a well-defined supply area for milk, known as a milkshed. In several of these milksheds there are very important secondary markets to be supplied with milk from the same area. The population of primary and secondary markets in the New York milkshed is equal to that of all such markets in the five other sheds. The milksheds overlap at certain points where milk from neighboring farms goes to different markets.

In 1934, about 154,000 farms were producing milk for primary and secondary markets in the six milksheds. The operators of about half of these farms were members of the leading cooperative bargaining associations. Another 5 percent were distributing their own milk. In the Baltimore and Washington milksheds, 90 percent or more of the farmers selling milk to dealers were members of the leading cooperatives. In the Connecticut milkshed about 30 percent of the producers were distributing their own milk.

Taking the six milksheds as a group, the total volume of milk handled by dealers was approximately 410,000 40-quart cans daily in the month of June, and 290,000 cans daily in November. The November volume expressed as a percentage of the June volume was 82 percent or higher in each of the milksheds except New York, where the ratio was only 62 percent. Milk supplies for the secondary markets generally showed less seasonal variation than the supplies for primary markets.

Again taking the six milksheds as a group: In June, 58 percent of the supply was used as fluid milk, 20 percent as cream; in November, 69 percent was used as fluid milk, 19 percent as cream. The proportion used for manufacture was 22 percent in June, 12 percent in November.

The New York milkshed had by far the greatest surplus of milk for manufacture; the proportion for June was 32 percent. This results from having a "closed" cream market and from the highly seasonal production necessary to insure adequate supplies of cream at all times.

In general a higher percentage of the supply was used as fluid milk in the secondary markets. Producer-dealers, as a group, had comparatively little surplus. In all except the New York milkshed, members of the leading cooperatives enjoyed proportionately more of the fluid-milk market than they did of the cream and manufactured-milk market.

While in 1934 cream shipped from States west of New York and Pennsylvania amounted to less than 3 percent of the total supply of milk and cream in the region, these shipments constituted about one-seventh of the total cream receipts at the Boston, New York, and Philadelphia markets. At Boston alone western cream amounted to 30 percent of the total receipts. Other eastern markets also received substantial quantities of western cream.

Principal sources of western cream during the past few years have been Michigan, Wisconsin, Indiana, Ohio, and Tennessee. Considerable quantities have been shipped from States as remote as Minnesota, Kansas, Missouri, and Texas. The extra transportation cost on western cream averages about $1.10 per 40-quart can. This is equal to 10 cents per 100 pounds of milk separated for cream. Changes in freight rates on western cream have been limited to a few temporary reductions, but lower transportation costs on part of the traffic have been obtained by shipping fresh cream in tank cars, shipping frozen cream of 50 percent butterfat content, and by shipping plastic or super-cream of 80 percent butterfat content.

Shipments of western cream, which began about 1924, increased rapidly with the increasing demand, the steady or decreasing production in the Northeastern States, and the curtailment of imports from Canada. By 1932 the expansion of the western-cream trade was halted by decreased consumption and increasing local production in the Northeast. Receipts of western cream at eastern markets during 1934 were the lowest for several years. It now appears probable that for the next few years the demand for milk and cream in the northeastern markets will expand faster than production, and that considerably larger shipments of western cream will be called for to supplement the local supply.

STATEMENT OF THE PROBLEM

The term "surplus" has been brought into more common use by the drastic deflation of commodity prices and the resulting curtailment of demand. Surplus, however, is not a new term in the milk industry. The surplus problem may, in fact, be characterized as a chronic ailment of this industry.

The definition of surplus milk varies according to conditions in different markets. In general, it is that part of the supply which is available for sale in a given market in excess of that which is required for consumption in fluid form, or for other uses that must be supplied throughout the year from the same sources as the fluid milk. The supply available for market usually is dependent upon the inspection and approval of stables, equipment, and cows on farms where the milk is produced, and of the plants where it is handled and processed. The health authorities of New York, Baltimore, and some other cities exercise practically the same supervision over fluid cream and milk products used in the manufacture of ice cream as they do over fluid milk. In such markets, the term surplus does not include milk required for this purpose. The health authorities of Boston, Philadelphia, and some other cities have limited their inspections mainly or wholly to fluid milk, and have not attempted to control or restrict the sources of cream for fluid use or for ice cream. In such markets the term surplus includes all milk available for sale in the market, in excess of the quantity required for use as fluid milk.

Every market in which there is a marked distinction in quality and in price between the milk used for consumption in fluid form and that which is used in the manufacture of butter, cheese, and other less perishable dairy products, has a surplus problem. The problem may differ in details according to prevailing local conditions, but its characteristic features may be outlined as follows:

1. Fluid milk is considered an essential food. Consequently, each market must be assured of an adequate supply at all times regardless of variations which may occur in either supply or demand. On account of the perishability and bulkiness of milk, and the restrictions commonly enforced by municipal health authorities, the milk supply for each market must be obtained regularly from dairy farms and dairy plants located within a limited area called the milkshed.

2. Both the demand for milk and the supply are subject to rather wide variations. Since the variations in supply are not readily subject to control, it is necessary to maintain available to each market a supply considerably in excess of the quantities actually used for

consumption in fluid form. Even with the best practicable adjustment of supply to demand, this necessary surplus amounts to approximately 15 to 20 percent of the quantity produced.

3. The excess, or surplus milk, has to be diverted to uses which yield comparatively low returns. Milk utilized in the manufacture of butter, cheese, and similar products, does not enjoy the price enhancement accorded to fluid milk because of the fact that sources of fluid supply are more limited by bulkiness, perishability, and sanitary restrictions. In fact, producers of fluid milk usually do not realize as much for surplus milk utilized in the manufacture of butter, cheese, and related products as the price paid by factories specializing in the production of these commodities in the areas more remote from markets.

4. As a rule, the surplus milk produced in each milkshed is not shared equally among the cooperative and independent producers or among the several dealers in proportion to their respective sales of fluid milk. In some cases the cooperative bargaining association and one or two of the principal dealers in the market have a disproportionate share of the surplus. Under these conditions, noncooperating dealers, with little surplus, often pay slightly higher prices to farmers, yet obtain a supply of milk for sale in fluid form at a lower net cost than their competitors. The consequences are, on the one hand, unjustifiable differences in prices received by farmers; and, on the other hand, low-cost milk to be used for price cutting in the city.

Briefly stated, the objectives in working toward a solution of the surplus problem are: To keep the supply of milk available for fluid use in each market in the closest possible adjustment with the demand; to segregate the surplus from the fluid-milk supply so that it will not interfere with the maintenance of stable and reasonably high fluid-milk prices; to bring about a more equitable sharing of the surplus among the producers and among the dealers in each milkshed; and to obtain higher returns for the surplus milk.

Importance to Northeastern Cooperatives

The surplus problem is especially serious in the large markets of the Northeastern States (fig. 1). This is a deficit region for dairy products. Most of the butter, a large proportion of the cheese and evaporated milk, and considerable quantities of cream used in these northeastern markets are shipped from the Midwestern States and other distant sources. Wages, feed prices, and other items of cost are higher in the northeastern milksheds than in the sections more remote from large centers of population. Costs of producing and handling market milk in this region are further enhanced by the strict sanitary requirements and the necessity for

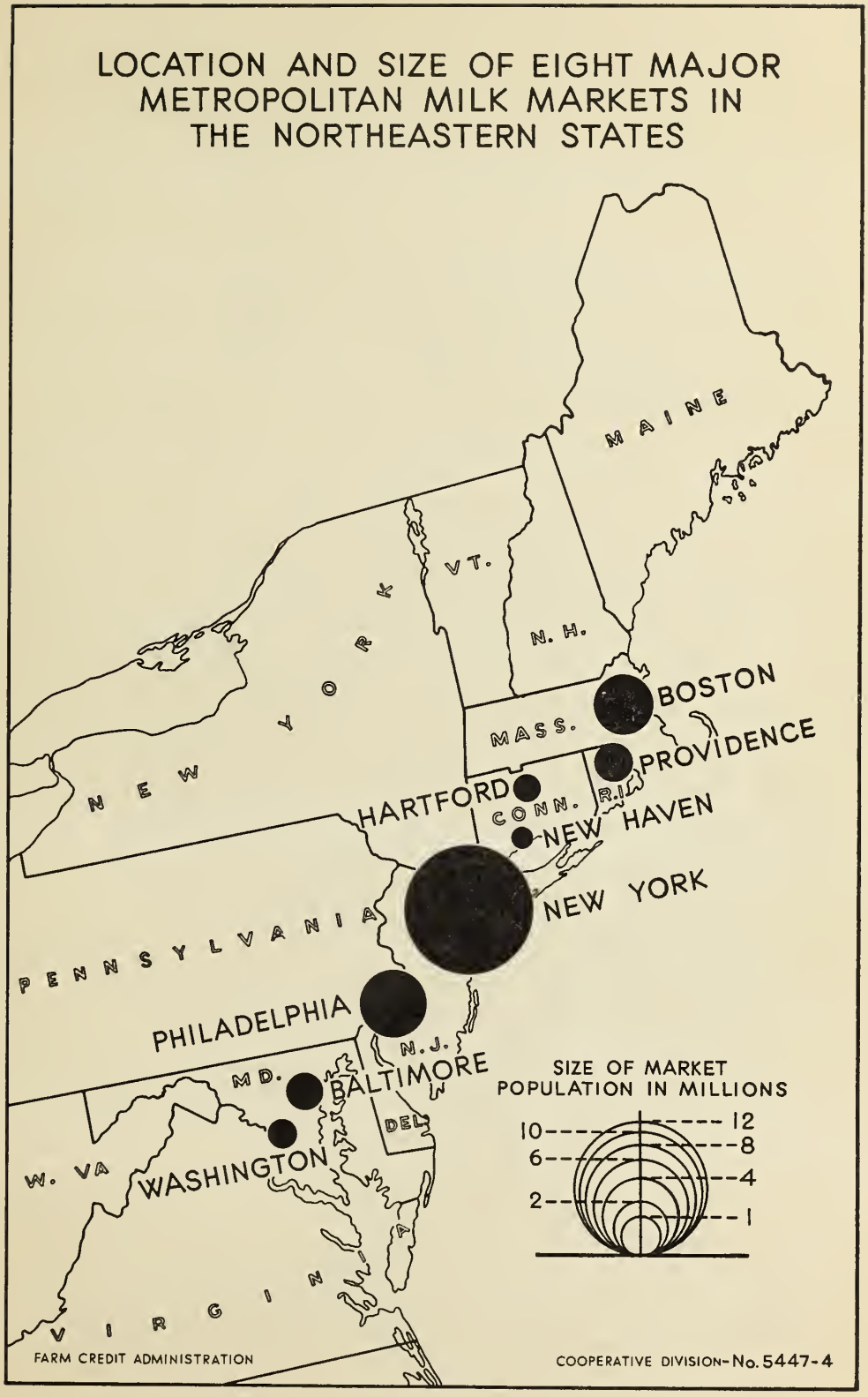

FIGURE 1. – *The major metropolitan milk markets lie along the northeastern seaboard, which is a deficit region for dairy products.*

maintaining a year-around supply. Relatively high prices are necessary in order to maintain production at a level adequate for local fluid-milk requirements. Normally there is a wide spread between fluid-milk prices in this region and the returns obtainable for milk utilized in butter, cheese, or other relatively concentrated, non-perishable products. Under these circumstances, the unstabilizing influence of surplus milk is very great.

In each of the milksheds tributary to the major northeastern markets, most of the producers are represented in a cooperative association whose main function is collective bargaining for the maintenance of satisfactory prices and marketing conditions for milk. The difficulties associated with surplus milk are among the chief obstacles to be overcome by these associations in the attainment of their objectives.

Study Requested

Realization of the importance of the surplus problem led the National Cooperative Milk Producers Federation, in 1932, to request the Federal Farm Board to make a study of the surplus problem in the northeastern milksheds. In accordance with this request a preliminary study was initiated by the Federal Farm Board and completed by the Farm Credit Administration in 1933. In the brief time available for the study, the investigators 2/ concerned themselves with such matters as the sources of supply of milk and cream for each of the major markets; milkshed boundaries; production and farm disposal of milk in the region; comparative quantities of fluid sales and surplus; the relative quantities handled or controlled by the cooperative bargaining associations and independent producers; location and proprietorship of country milk plants; and comparative net prices to producers in the several milksheds. The report of this survey supplied much information that is useful in determining the best procedure for dealing with the surplus problem in this region. Because of the continued interest on the part of the cooperatives and the need for further information in working out solutions for the several aspects of the problem, the present study was undertaken by the Cooperative Division in the summer of 1934.

2/ T. G. Stitts, A. W. McKay, John J. Scanlan, H. J. Limbacher, and John H. Lister.

SCOPE AND METHOD OF THE STUDY

The present study covers approximately the same territory as the preliminary survey; namely, the New England States, New York, New Jersey, Pennsylvania, Delaware, Maryland, and the District of Columbia. It does not, however, include the Pittsburgh and Richmond markets, since it was found that their supplies are intermingled only to a limited extent with those of other northeastern markets. Chief attention has been given to the major markets in this area, including Boston, Hartford, New York, Philadelphia, Baltimore, and Washington, and to the milksheds tributary to these markets. In addition to the data concerning the supply and utilization of milk, which were obtained from State and Federal departments of agriculture, and that furnished by the cooperative associations, much information of a confidential nature pertaining to the amount and disposal of surplus milk, purchases of cream, and the like, was obtained directly from the principal dealers in each market. Data concerning shipments of cream from Western States to the eastern markets were obtained from the railroad companies. Most of the statistical information so gathered pertains to the period June 1933 to June 1934, inclusive. Some data for more recent months also have been included.

Since unavoidable delays have occurred in compiling and summarizing some of the data, this preliminary report is given in order to make available to cooperative association leaders, milk dealers, and others the more important facts and conclusions derived from the study to date.

The information presented in this report pertains principally to the production and utilization of milk in the northeastern dairy sections, the extent and boundaries of the several milksheds, the quantities and uses of surplus in these milksheds, and the volume and sources of cream shipped from midwestern States to the eastern markets.

PRODUCTION AND UTILIZATION OF MILK IN THE NORTHEASTERN STATES

The Demand and Supply Situation

The most important fact in the milk-marketing situation in the Northeastern States is the large urban population. The region including 11 States, from Maine to Maryland, and the District of Columbia, embraces less than 6 percent of the farm acreage of the United States (fig. 2), but it contains fully 40 percent of the people who live in cities and villages of 2,500 or more population. Including the rural residents, in 1930 this northeastern section had

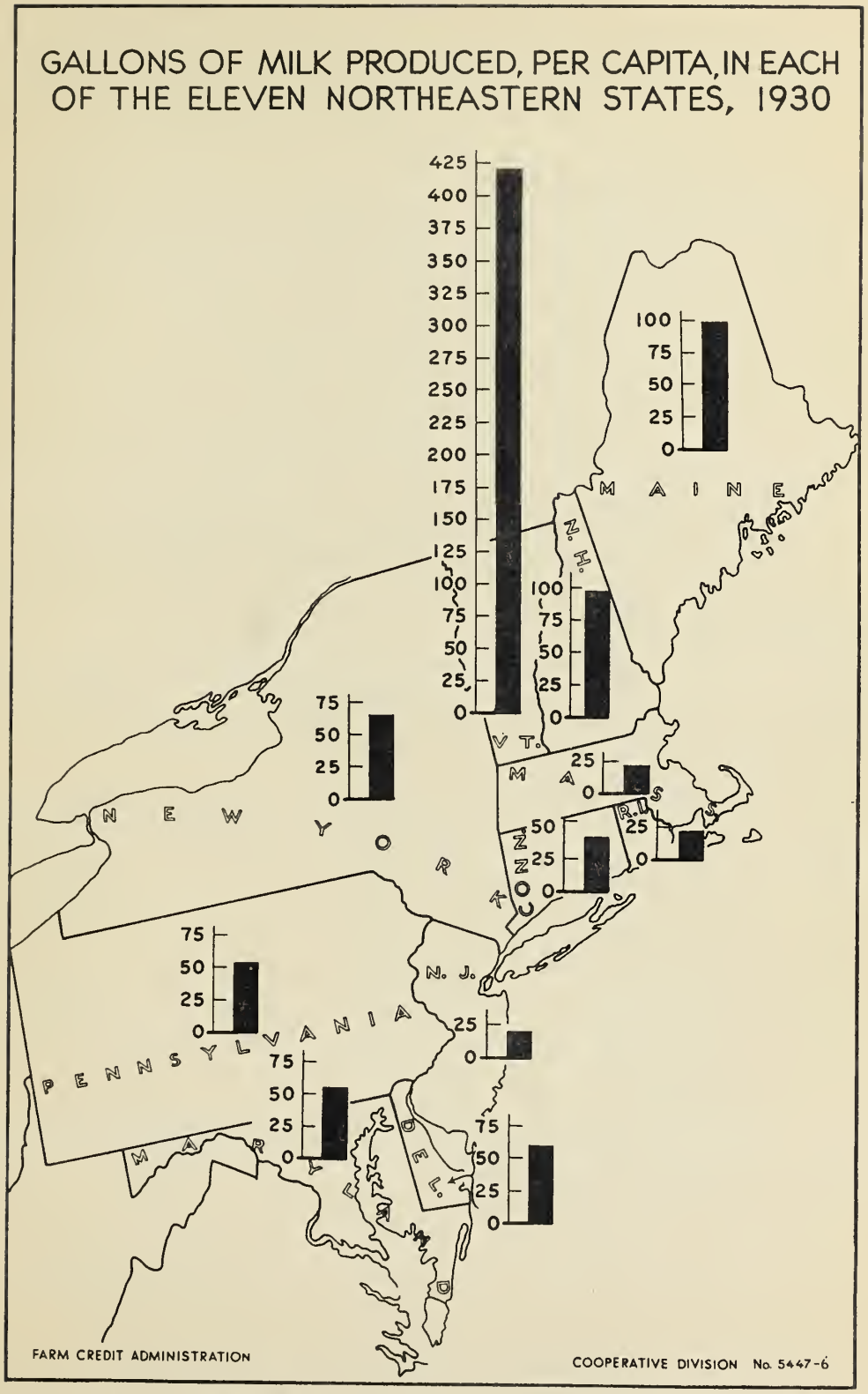

FIGURE 2. – *The great concentration of population in the 11 northeastern States makes for low per capita production, except for Vermont, New Hampshire, and Maine.*

one person for each acre and a half of land in farms; whereas, in the other 37 States there were almost 11 acres for each person. The demand for dairy products and other foods in the Northeastern States greatly exceeds their farm output.

Throughout most of the area covered by this study, dairying is the principal branch of agriculture. In the 11 States, the annual production of milk is equivalent to 35 gallons per acre of land in farms, compared with an average of only 10 gallons for the other 37 States (table 1). Rhode Island, with 55 gallons of milk per acre, is the most intensive dairy State in the group (fig. 3). New Jersey, New York, Connecticut, Massachusetts, and Vermont rank high in the list, with an annual production of from 39 to 46 gallons per acre of farm land. In Maine, Maryland, and Delaware, milk production is relatively small in proportion to the farm acreage.

Table 1. - Number of milk cows per 1,000 population, and milk production per capita and per acre in the Northeastern States, and other States, 1930

State or region	Milk cows per 1,000 population	Milk produced annually: Per capita	Milk produced annually: Per acre of farm land
	Number	Gallons	Gallons
Maine	172	99	16
New Hampshire	166	98	22
Vermont	742	421	39
Massachusetts	32	22	43
Connecticut	65	43	45
Rhode Island	32	23	55
New York	103	66	46
New Jersey	29	21	46
Pennsylvania	89	54	33
Maryland	110	55	20
Delaware	131	61	16
Average, 11 States and District of Columbia	88	54	35
Average, other States	227	116	10
Average, United States	186	97	12

Source: Computed from data on number of cows and milk production reported in Milk Production Trends, Statistical Supplement No. 8, 1933, issued by the U. S. Bureau of Agricultural Economics; and from data on population and farm land area reported by the U. S. Bureau of the Census.

Although these Northeastern States constitute one of the most important dairy regions in the United States, the number of cows and the supply of milk is not large in proportion to the population. In fact, the 11 States have less than half as many cows per thousand people as the average for the country as a whole. The quantity of milk produced annually amounts to 54 gallons per capita; whereas, the annual consumption of milk in all dairy products is nearly twice as much. In general, these States produce all the fluid milk and most of the fluid cream consumed within their borders, but a large proportion of the butter, cheese, evaporated milk, and milk products used in ice cream are imported from other States.

Milk Production and Disposal by Farmers

Due mainly to the large demand for market milk and the relatively intensive system of dairying in these States, an unusually high proportion of the milk is sold by farmers in fluid form. In 1934, about one-eighth of the milk was retailed by farmers, and nearly two-thirds was sold as whole milk to dealers (table 2). In this region, very little cream is skimmed on farms for sale to butter factories, and the quantity required for household use and the feeding of calves on farms is a small part of the total.

Table 2. - Percentage of milk disposed of in various ways by farmers in eleven Northeastern States, and in other States, 1934

Method of disposal	Percentage of supply so disposed of by farmers of 11 northeastern States 1/	Other States	United States
	Percent	Percent	Percent
Milk used on farms:			
As milk or cream	7.2	13.1	12.1
For making butter	6.1	11.8	10.8
For feeding calves	2.8	2.7	2.7
Total used on farms	16.1	27.6	25.6
Milk separated for sale as butterfat	3.7	39.8	33.6
Sales of milk and market cream:			
Retail	12.4	6.0	7.1
Wholesale	67.8	26.6	33.7
Total	100.0	100.0	100.0

1/ Includes the States of Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Maryland and Delaware.

Source: Milk Production Trends, Statistical Supplement No. 8, Bureau of Agricultural Economics.

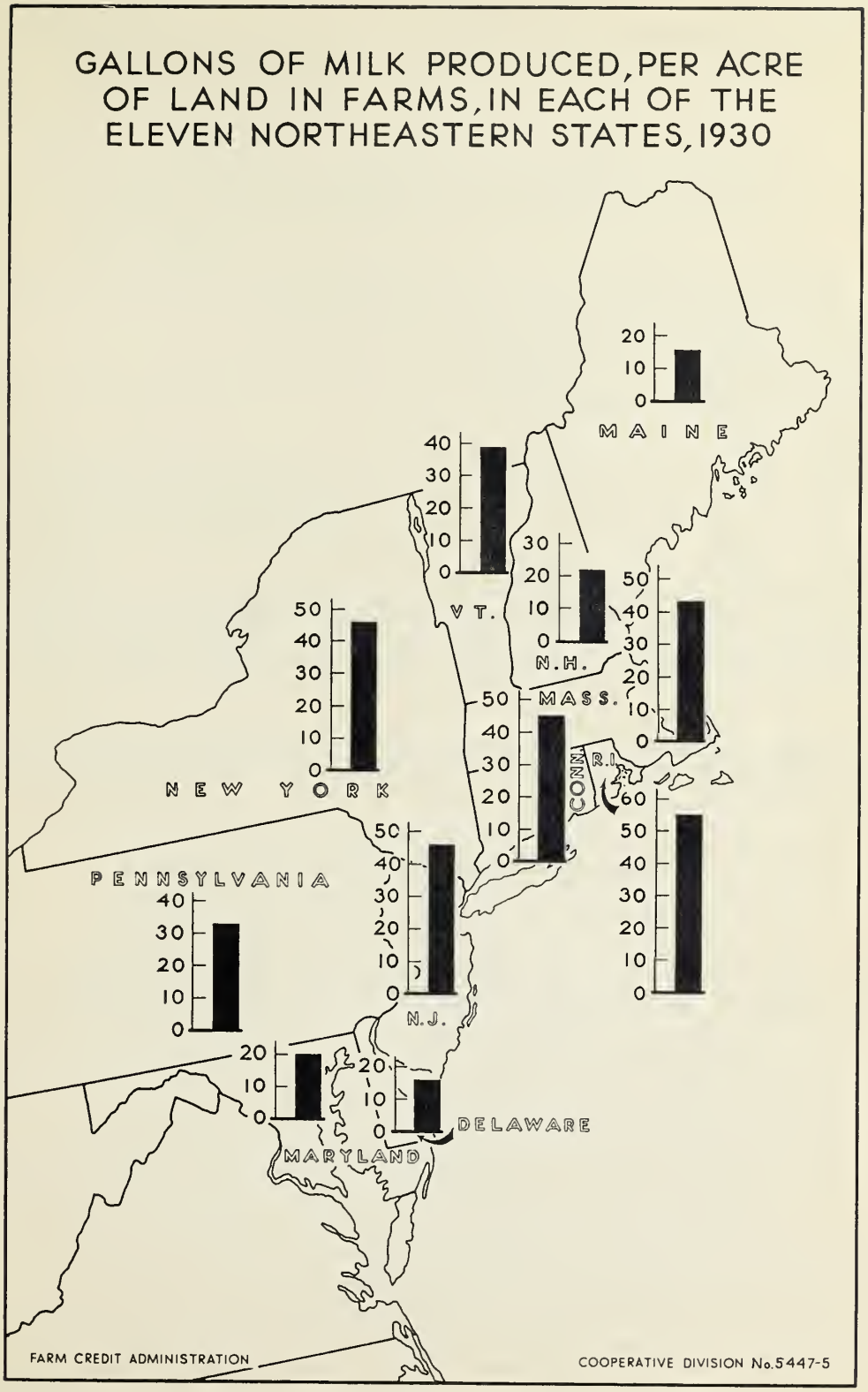

FIGURE 3. – *Production of milk per acre of land in farms varied from 16 gallons in Delaware and Maine to 55 gallons in Rhode Island. Average production for the States was 35 gallons or 3½ times that for the rest of the country.*

In 1934, the total production of milk in the Northeastern States was 17 percent of the total for the entire country, but the quantity sold by northeastern farmers as whole milk was about one-third the United States total (table 3).

Table 3. - Relation of production and disposal of milk by farmers in eleven Northeastern States to total milk production and disposal by farmers in the United States, 1934

	Production and disposal of milk by farmers of -		
	11 northeastern States 1/	Other States	United States
	Percent	Percent	Percent
Total milk production	17.1	82.9	100.0
Milk and cream used on farms	10.7	89.3	100.0
Milk separated for sale as butterfat	1.9	98.1	100.0
Sales of milk and market cream:			
Retail	30.0	70.0	100.0
Wholesale	34.5	65.5	100.0

1/ Includes the states of Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Maryland and Delaware.

Source: Computed from data reported in Milk Production Trends, June 1935, issued by the U. S. Bureau of Agricultural Economics.

Total Supply and Utilization of Milk

Annual Supply and Utilization for 1934

The northeastern market milk-producing area has been largely self-contained with respect to the supply and consumption of the more perishable kinds of dairy products. The supply of milk produced has been supplemented, to a limited extent only, by milk and cream drawn by the Washington market from nearby counties in Virginia and West Virginia, and by cream shipped from a number of western States to the eastern markets. As the population and the demand for these perishable dairy products increases, it is not unlikely that the eastern markets will depend to a greater extent upon more distant sources of supply. Of course, the major part of the butter, cheese, evaporated milk, and other less perishable kinds of dairy products consumed in these markets already comes from the more remote dairy regions, chiefly the Central West. Practically all the milk produced in the Northeastern States is consumed in one form or another within the area, very little being shipped out in any form.

In 1934, the total supply of milk and cream produced or shipped into this area was nearly 18 billion pounds. Nearly 95 percent of this supply was produced on the farms in the area, and an additional 2 percent was produced by cows kept in the cities and villages. Western cream accounted for less than 3 percent of the total (table 4).

About two-thirds of the entire supply was consumed as fluid milk and cream by people living in cities and villages or on farms where no cows were kept. An additional 7 percent was used in fluid form by farm families who had their own cows. Between 5 and 6 percent of the milk was used in butter-making on farms, and between 2 and 3 percent for feeding calves. Altogether, nearly one-sixth of the entire milk supply of the Northeastern States was used on the farms where produced. A little more than one-seventh of the milk was converted into manufactured products at dairy plants.

Although the region as a whole is nearly self-sufficient, there are large interstate movements of milk within the area. Massachusetts, Connecticut, Rhode Island, New Jersey, and the District of Columbia depend on other States of the group for part of the milk required for consumption as fluid milk and cream (tables 5 and 6). Massachusetts and New Jersey, particularly, are large importers of milk and cream from other States. Vermont, with three cows for every four persons in the State, has by far the largest shipments of milk and cream to other States (table 7).

In the several deficit States, from 80 percent to 90 percent of the total milk supply in 1934 was used in the cities and villages for consumption in fluid form (table 6). In some of the States whose production exceeds the local demand, a considerable proportion of the milk is used for manufacture (table 9). In New York State, for example, about 20 percent of the milk supply for 1934 was used for manufacture. New York State and Pennsylvania are outstanding with respect to the quantities of milk used for manufacture. These two States account for 59 percent of the milk consumed in fluid form and for 85 percent of the milk used for manufacture in the entire area.

Milk Used in Manufactured Dairy Products

In the last six years, the total quantities of milk and cream used in the manufacture of dairy products in the Northeastern States, not including milk chocolate, have changed comparatively little. There was a gradual decline from 1929 to 1932, followed by a moderate increase in 1933 and 1934 (table 9). There have been some striking changes in the quantities of milk manufactured in certain of the States. Comparing figures for 1934 with those for 1929, Maine, New Hampshire, Vermont, Connecticut, and New Jersey show decreases of from 40 to 50 percent. In New York, the large volume of milk manufactured has increased slightly, while the smaller quantities manufactured in Maryland and Delaware were nearly 50 percent greater in 1934 than in 1929.

Table 4. - Supply and utilization of milk and cream in the Northeastern States, 1934 1/

Item	Quantity	Percentage of total utilization
	Million pounds	Percent
Supply:		
Production by cows on farms	16,948	94.8
Production by cows not on farms	345	1.9
Milk and cream from Virginia and West Virginia	114	0.6
Western cream	486	2.7
Total supply	17,893	100.0
Utilization:		
Used on farms producing milk, for -		
Fluid milk and cream	1,250	7.0
Butter	1,027	5.7
Calves	476	2.7
Used by families in cities and villages; also by those on farms without cows, for fluid milk and cream	11,961	66.9
Used for manufacture (net)	2,745	15.3
Waste and unaccounted for	434	2.4
Total utilization	17,893	100.0

1/ Including Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Maryland, Delaware, and the District of Columbia.

Source: Estimates based largely on data published or compiled by the Bureau of Agricultural Economics.

Table 5. - Supply and utilization of milk and cream in Northeastern States not producing enough milk to supply the demand for fluid milk and cream, 1934

(Million pounds)

Item	Massa-chusetts	Connect-icut	Rhode Island	New Jersey	District of Columbia
Supply:					
Production by cows on farms	707	594	127	748	--
Production by cows not on farms	48	14	5	15	--
Milk and cream from Virginia and West Virginia	--	--	--	--	114
Western cream	176	22	10	60	18
Milk and cream from other States in the district (net)	791	78	134	771	46
Total supply	1,722	708	276	1,594	178
Utilization:					
Used on farms producing milk, for -					
Fluid milk and cream	53	42	6	48	--
Butter	14	11	1	12	--
Calves	15	17	3	15	--
Used by families in cities and villages; also by those on farms without cows, for fluid milk and cream	1,527	579	250	1,428	160
Used for manufacture (net)	94	44	13	72	18
Waste and unaccounted for	19	15	3	19	--
Total utilization	1,722	708	276	1,594	178

Source: Estimates based largely on data published or compiled by the Bureau of Agricultural Economics.

Table 6. - Supply and utilization of milk and cream in percentage of totals for Northeastern States not producing enough milk to supply the demand for fluid milk and cream, 1934

Item	Massachusetts	Connecticut	Rhode Island	New Jersey	District of Columbia
	Percent	Percent	Percent	Percent	Percent
Supply:					
Production by cows on farms	41.1	83.9	46.0	46.9	---
Production by cows not on farms	2.8	2.0	1.8	0.9	---
Milk and cream from Virginia and West Virginia	---	---	---	---	64.0
Western cream	10.2	3.1	3.6	3.8	10.1
Milk and cream from other States in the district (net)	45.9	11.0	48.6	48.4	25.9
Total supply	100.0	100.0	100.0	100.0	100.0
Utilization:					
Used on farms producing milk, for -					
Fluid milk and cream	3.1	5.9	2.2	3.0	---
Butter	0.8	1.6	0.4	0.8	---
Calves	0.9	2.4	1.1	0.9	---
Used by families in cities and villages; also by those on farms without cows, for fluid milk and cream	88.7	81.8	90.5	89.6	89.9
Used for manufacture (net)	5.4	6.2	4.7	4.5	10.1
Waste and unaccounted for	1.1	2.1	1.1	1.2	---
Total utilization	100.0	100.0	100.0	100.0	100.0

Table 7. - Supply and utilization of milk and cream in Northeastern States producing more than enough milk to supply the demand for fluid milk and cream, 1934

(Million pounds)

Item	Maine	New Hampshire	Vermont	New York	Pennsylvania	Maryland	Delaware
Supply:							
Production by cows on farms	628	367	1,246	7,149	4,495	758	129
Production by cows not on farms	22	18	13	54	138	17	1
Western cream	---	---	---	58	128	11	3
Total supply	650	385	1,259	7,261	4,761	786	133
Utilization:							
Used on farms producing milk, for -							
Fluid milk and cream	76	31	65	388	427	98	16
Butter	156	33	37	332	349	73	9
Calves	13	8	29	250	108	15	3
Used by families in cities and villages; also by those on farms without cows, for fluid milk and cream	240	149	94	4,589	2,468	419	58
Used for manufacture (net)	12	4	48	1,456	896	80	8
Waste and unaccounted for	16	10	32	181	116	20	3
Milk and cream supplied to other States in the district (net)	137	150	954	65	397	81	36
Total utilization	650	385	1,259	7,261	4,761	786	133

Source: Estimates based largely on data published or compiled by the Bureau of Agricultural Economics.

Table 8. - Supply and utilization of milk and cream in percentage of totals for Northeastern States producing more than enough milk to supply the demand for fluid milk and cream, 1934

Item	Maine	New Hampshire	Vermont	New York	Pennsylvania	Maryland	Delaware
	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Supply:							
Production by cows on farms	96.6	95.3	99.0	98.5	94.4	96.4	97.0
Production by cows not on farms	3.4	4.7	1.0	0.7	2.9	2.2	0.8
Western cream	---	---	---	0.8	2.7	1.4	2.2
Total supply	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Utilization:							
Used on farms producing milk, for -							
Fluid milk and cream	11.7	8.0	5.2	5.3	9.0	12.5	12.1
Butter	24.0	8.6	2.9	4.6	7.3	9.3	6.8
Calves	2.0	2.1	2.3	3.4	2.3	1.9	2.2
Used by families in cities and villages; also by those on farms without cows, for fluid milk and cream	36.9	38.7	7.5	63.2	51.9	53.3	43.6
Used for manufacture (net)	1.8	1.0	3.8	20.1	18.8	10.2	6.0
Waste and unaccounted for	2.5	2.6	2.5	2.5	2.4	2.5	2.2
Milk and cream supplied to other States in the district (net)	21.1	39.0	75.8	0.9	8.3	10.3	27.1
Total utilization	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 9. - Milk equivalent of all dairy products manufactured in each of the Northeastern States, 1929-1934 1/

(Million pounds)

State	1929	1930	1931	1932	1933	1934
Maine	20.3	19.3	16.0	10.9	9.3	12.2
New Hampshire	8.3	8.2	7.8	5.6	3.7	4.1
Vermont	105.8	99.8	82.0	57.0	58.9	48.3
Massachusetts	117.3	125.1	102.6	82.6	80.8	93.7
Connecticut	71.7	65.0	55.3	48.1	42.4	43.6
Rhode Island	17.9	14.9	14.2	11.4	12.3	12.9
New York	1,364.7	1,393.7	1,338.9	1,223.9	1,314.0	1,414.9
New Jersey	139.9	117.7	113.6	70.2	58.2	71.9
Pennsylvania	843.1	831.4	745.2	628.2	616.0	682.5
Maryland	55.3	48.2	40.4	40.5	65.5	80.0
Delaware	5.5	9.1	8.9	7.7	7.7	8.0
District of Columbia	18.6	18.2	18.2	15.5	15.3	17.7
Total	2,768.4	2,750.6	2,543.1	2,201.6	2,284.1	2,489.8

1/ Milk chocolate and some minor products not included.

Source: Data from report on Milk Equivalent of Production of Manufactured Dairy Products, U. S. Bureau of Agricultural Economics, June 1935 (mimeographed report).

In Maine and Vermont, the decreased output of creamery butter accounted for most of the decline in manufactured milk. Decreased production of factory-made ice cream accounts for the greatly reduced quantities of milk used for manufacture in New Hampshire, Connecticut, and New Jersey. In New York State, the decreased output of ice cream was more than offset by larger production of creamery butter. Only a small percentage of the Maryland milk supply is manufactured, but the production of creamery butter in that State showed a striking increase in 1933 and 1934.

Considering the region as a whole, the most significant changes in output of manufactured dairy products since 1929 have been the decrease in the quantity of ice cream made and the increase in creamery butter (table 10). Milk and cream used in the manufacture of ice cream amounted to 42 percent of the total volume of milk manufactured in 1929, but dropped to 34 percent in 1934. Creamery butter required 18 percent of the milk manufactured in 1929, and 25 percent in 1934.

Manufactured dairy products, as they relate to the problem of surplus milk, are of two kinds. The highly perishable products such as ice cream and cream cheese must be produced in, or close to, the large centers of population. Because of the advantages of manufacturing these products in close proximity to markets, and the need for raw materials of high quality, plants manufacturing ice cream and cream cheese usually have first call on milk supplies in excess of the demand for fluid milk and cream. Many plants engaged in the manufacture of these products obtain some of the required milk fat and other milk solids in the form of cream, condensed milk, butter, and powdered skim milk shipped from the more remote dairy regions. In general, the quantity of milk used by such plants depends upon the current local demand for ice cream and cream cheese. Plants manufacturing milk chocolate are in a similar position, except that they make a wider distribution of the finished product.

As to the less perishable products such as butter, American cheese, and evaporated milk, the locality of production is determined chiefly by the volume and cost of available milk supplies. Such products can be, and for the most part are, produced in dairy regions remote from the principal markets. However, they afford an outlet for seasonal and other surpluses in sections devoted primarily to the production of market milk. The quantity of milk used in the manufacture of these products in the market milk areas is determined mainly by the excess of current production over the demand for fluid milk and cream. In other words, the quantity of butter, cheese, and evaporated milk being made in market-milk areas such as the Northeastern States, at any time, is a reliable indication or measure of the quantity of surplus milk in those areas.

Table 10. - Milk equivalents of the various dairy products manufactured in the Northeastern States, 1929-1934 1/

(Million pounds)

Product	1929	1930	1931	1932	1933	1934
Creamery butter	552.0	555.9	552.4	522.4	641.1	665.8
American cheese	291.3	337.3	293.4	248.5	299.6	296.4
Other cheese	281.7	293.1	269.6	253.3	263.9	294.3
Evaporated milk (case goods)	250.4	250.1	255.6	303.2	278.1	262.4
Plain condensed milk	100.5	77.4	75.1	59.8	64.4	87.4
Sweetened condensed milk:						
Case goods	95.5	87.1	71.7	55.8	46.0	44.6
Bulk goods	18.3	13.2	12.0	14.0	16.2	18.0
Ice cream	1,560.0	1,513.7	1,388.3	1,037.5	966.5	1,164.9
Powdered whole milk	47.7	45.1	27.5	22.7	16.1	20.3
Powdered cream	3.4	3.3	--	0.3	0.7	0.2
Total	3,200.8	3,176.2	2,945.6	2,517.5	2,592.6	2,854.4
Duplications 2/	432.4	425.6	402.6	315.9	308.5	364.5
Net total	2,768.4	2,750.6	2,543.0	2,201.6	2,284.1	2,489.9

1/ Including Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Maryland, Delaware, and District of Columbia.

2/ Butter made from whey cream, also butter and concentrated milk used in the production of ice cream.

Source: Data for 1929-1933 from: Milk Equivalent of Production of Manufactured Dairy Products, Mimeographed Report by Bureau of Agricultural Economics, June 1935. Data for 1934 computed from Statistics of Dairy Products Manufactured, reported by Bureau of Agricultural Economics, October 1935.

In 1934, the Northeastern States which are included in this study accounted for about one-sixth of the total milk production of the entire country, about one-half of the milk used in such highly perishable products as ice cream, cream cheese, and milk chocolate, and only one-thirtieth of the milk used in the manufacture of the less perishable products such as butter, evaporated milk, and American cheese (table 11). Sweetened condensed milk and plain condensed milk (which probably should be included among the more perishable products) are the only ones in the latter group, of which the Northeastern States produced as much as 20 percent of the national output in 1934.

In 1933 and 1934, roughly equal quantities of milk were utilized in the Northeastern States in the production of ice cream, cream cheese, and milk chocolate, and in the manufacture of the less perishable products such as butter, American cheese, and evaporated milk (table 12).

The total milk equivalent of all products manufactured in this area in 1934 was a little more than three billion pounds. This is equal to the total milk production of Maine, New Hampshire, Vermont, and Connecticut. The output of ice cream, cream cheese, and milk chocolate in this area increased about 27 percent from 1933 to 1934, but there was little change in the combined output of other dairy products.

Nearly 30 percent of the milk fat used in the ice cream and milk chocolate was obtained from butter, condensed milk, and milk powder, the major quantities of which were shipped in from States farther west. The figures also include a small duplication in the form of butter churned from whey cream. The net milk equivalent of all dairy products manufactured in the Northeastern States in 1934, excluding the butter and concentrated milk used in ice cream and milk chocolate, as well as the butter churned from whey cream, was approximately 2 3/4 billion pounds. This is equal to the total milk production of Maine, Vermont, and Connecticut.

Much of the western cream shipped into the Northeastern States is used in the manufacture of ice cream, cream cheese, and milk chocolate. The total volume of western cream coming into these States in 1934 was equal to nearly 30 percent of the total milk equivalent in these products.

Seasonal Utilization of Milk

The consumption of fluid milk and cream in the Northeastern States varies less according to season than the farm sales of milk and cream or the total supply of milk and cream including shipments from outside the area. In consequence, the volume of surplus milk and the quantity of dairy products manufactured from this surplus vary even more than the milk and cream sales by farmers (table 13 and figure 4). When the daily averages for 1933 and 1934 are taken as 100, the quantities of milk and cream sold by farmers in this area varied from 87 in February

Table 11. - Total milk equivalent of dairy products manufactured in the United States and in the Northeastern States, 1934

Product	Whole milk equivalent United States	Whole milk equivalent Northeastern States	Northeastern States output as a percentage of United States total
	Million pounds	Million pounds	Percent
Highly perishable products:			
Ice cream	2,679.6	1,165.1	43.5
Cream cheese	372.2	219.3	58.9
Milk chocolate	349.0	327.4	93.8
Total	3,400.8	1,711.8	50.3
Less perishable products:			
Creamery butter	34,424.1	666.6	1.9
American cheese	4,472.2	295.9	6.6
Other cheese	981.7	74.4	7.6
Evaporated milk	3,676.7	260.9	7.1
Sweetened condensed milk:			
Case goods	134.1	43.7	32.6
Bulk goods	94.1	18.0	19.1
Plain condensed milk	225.7	86.9	38.5
Powdered whole milk	120.5	20.4	16.9
Powdered cream	1.3	0.2	15.4
Malted milk	36.4	---	---
Total 1/	44,166.8	1,467.0	3.3
All manufactured products	47,567.6	3,178.8	6.7

1/ Duplications: Net milk equivalents, excluding butter and concentrated milk used in ice cream and milk chocolate, also butter made from whey cream, were as follows (in millions of pounds):

	United States	Northeastern States
Ice cream	2,103.0	846.3
Milk chocolate	258.3	255.3
Butter	34,017.5	623.0

Source: Based on data compiled by the U. S. Bureau of Agricultural Economics.

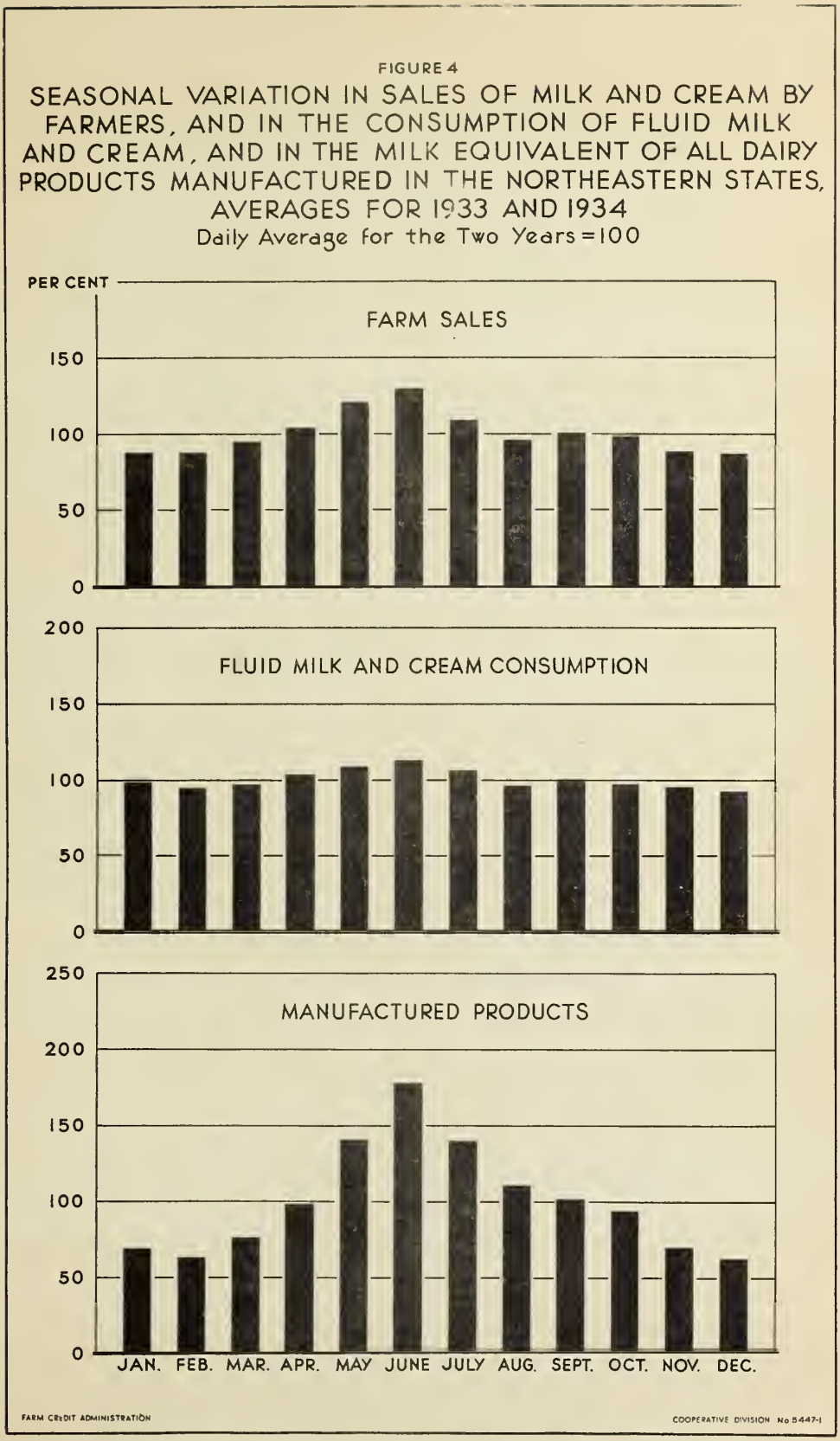

FIGURE 4. – *Farm production and sales vary more than does fluid consumption. As manufactured products must absorb the excess over fluid consumption they show a high seasonal variation.*

Table 12. - Milk equivalent of dairy products manufactured in the Northeastern States, 1933 and 1934

(Million pounds)

Item	1933	1934
Ice cream, cream cheese and milk chocolate	1,346.8	1,711.8
Other dairy products, including butter, American cheese, evaporated milk, and similar products	1,429.7	1,467.0
Total	2,776.5	3,178.8
Duplications:		
Butter and concentrated milk used in the production of ice cream and milk chocolate	285.2	390.9
Butter made from whey cream	41.6	43.6
Net milk equivalent of all manufactured dairy products	2,449.7	2,744.3

Source: Based on data compiled by Bureau of Agricultural Economics.

to 129 in June, a range of 42 points; the consumption of fluid milk and cream varied from 92 in December to 113 in June, a range of only 21 points; and the milk equivalent of all dairy products manufactured in the area varied from 62 in December to 178 in June, a range of 116 points. 3/

There are marked differences in the seasonal output of the several manufactured dairy products. As previously stated, the production of ice cream, cream cheese, and milk chocolate is closely correlated with consumption, while the output of the less perishable products, such as American cheese, butter, and evaporated milk, depends on the quantity of surplus milk that happens to be available.

3/ In computing the milk equivalent of dairy products on a monthly basis, it was impracticable to give effect to seasonal changes in the butterfat test of milk as produced. The amount of error caused by the assumption of a uniform test throughout the year may be judged from the fact that in New York State, where the variation probably is greatest, the average butterfat test of milk delivered to plants in 1933 ranged from 3.65 percent in April to 3.91 percent in December.

Table 13. - Seasonal variation in the sales of milk and cream by farmers, in the consumption of fluid milk and cream, and in the milk equivalent of all dairy products manufactured in the Northeastern States, average of 1933 and 1934

(Daily average for the 2 years = 100)

Month	Total sales of milk and cream by farmers 1/	Consumption of fluid milk and cream 2/	Milk equivalent of all manufactured dairy products 3/
January	87.5	98.2	68.2
February	87.4	94.8	62.7
March	94.7	97.1	75.8
April	103.7	103.2	98.0
May	120.8	108.6	140.2
June	129.4	112.7	177.8
July	108.3	105.9	139.2
August	95.5	96.0	110.2
September	100.1	98.8	101.1
October	98.3	97.0	93.4
November	87.6	95.1	69.2
December	86.7	92.1	62.2

1/ Based on records of dealers' purchases from producers.

2/ Based on dealers' sales of milk and cream for fluid use as reported to Division of Milk Control, New York State Department of Agriculture and Markets.

3/ Computed from special monthly tabulation of Dairy Products Manufactured in the Northeastern States, Bureau of Agricultural Economics. Duplications consisting of butter and concentrated milk used in ice cream, and butter churned from whey cream, excluded.

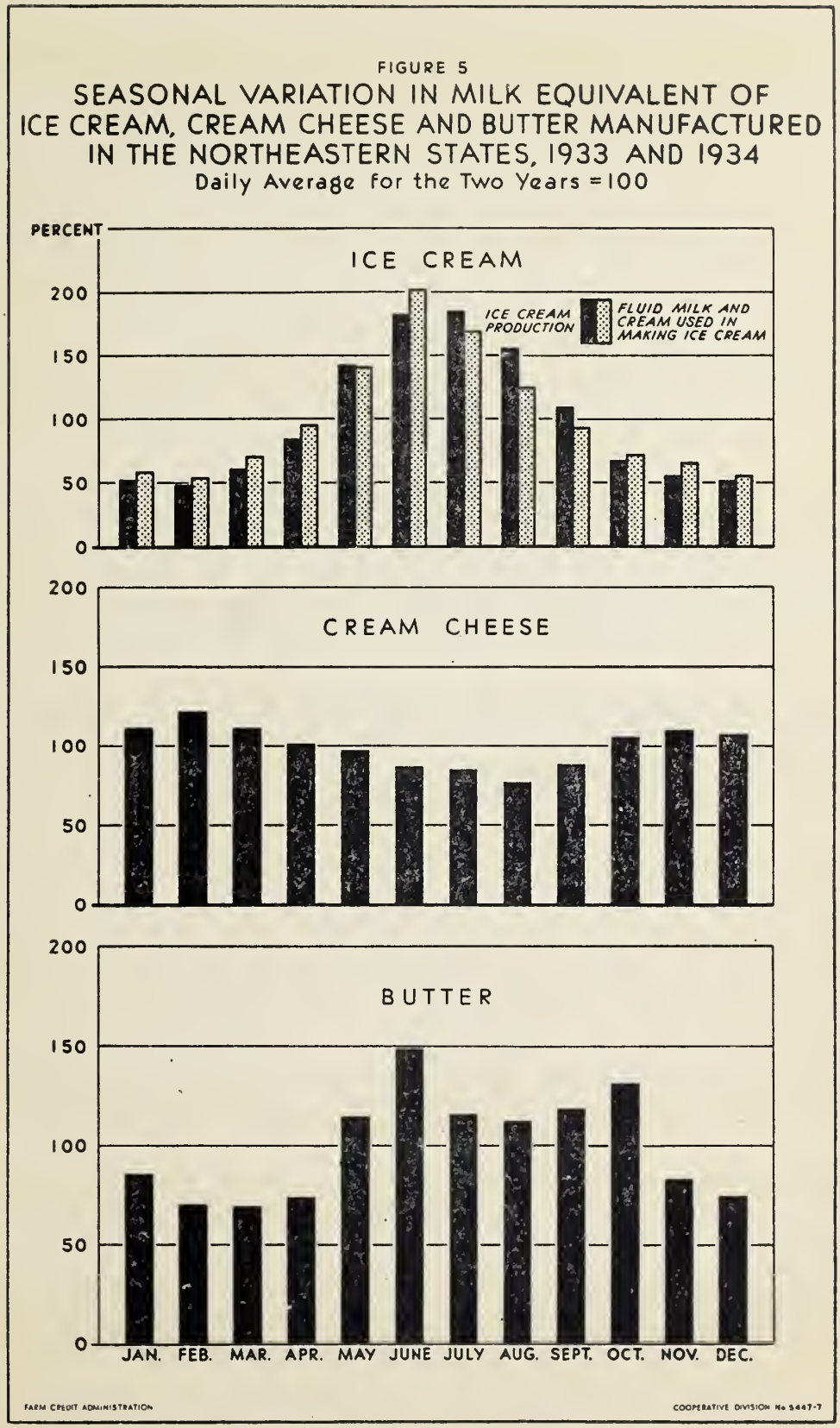

FIGURE 5. – *The manufacture of ice cream and cream cheese follows seasonal demands for consumption. Variations in manufacture of butter, which can be stored readily, follow seasonal variations in milk production.*

Ice cream production has a seasonal peak in May, June, July, and August. The daily output in these months is about three times the average for the period October to March, inclusive (table 14). For the year 1933, 27.8 percent of the milk fat used in the ice cream produced in this area was obtained from butter and concentrated milk, and 72.2 percent from milk and cream. Incomplete data, on a monthly basis, for 1933 indicate that from 70 to 78 percent of the total milk fat used by the ice cream manufacturers in May, July, August, and September was derived from milk and cream, and from 22 to 30 percent from butter and various forms of concentrated milk. In other months of the year, from 83 to 88 percent of the fat used was derived from milk and cream, and 12 to 17 percent from butter and concentrated milk. Therefore, if only the milk and cream used directly in the manufacture of ice cream are considered, the seasonal volume was relatively less in May, July, August, and September, and relatively more in all the other months, as compared with the total output of ice cream (table 14 and figure 5).

The heavy demand from ice cream manufacturers in the spring and early summer fits in well with the high production and normally large surpluses of milk in those months. However, it is often difficult to fill the requirements of the ice cream manufacturers from local sources in the late summer and early fall. At such times they use more western cream, or milk solids stored in some convenient form such as frozen cream, butter, or concentrated milk.

No data were available concerning the seasonal changes in the manufacture of milk chocolate. The larger chocolate factories, as well as some of the ice cream manufacturers, follow the practice of putting away milk fat and solids in some concentrated form when surplus milk is available at low prices.

The output of cream cheese is much less variable according to season than the output of ice cream, and production tends to run lower in summer than in winter. This does not conform at all to the seasonal production of milk or to the seasonal volume of surplus in the area. Nevertheless, the relatively large requirements of cream cheese manufacturers in the late winter and early spring afford the most satisfactory outlets for surplus milk at a season when other outlets are most limited. Cream cheese factories have been an especially important outlet for frozen cream which has been carried through the season to insure against shortages of market milk and cream.

Butter production in this area shows much less seasonal variation than cheese or evaporated milk. Probably about half the creamery butter produced in the Northeastern States in 1933 and 1934 was made from cream skimmed on farms not producing market milk. The other half was made from milk qualified for sale as fluid milk or cream. Butter making affords the most convenient outlet for small, irregular quantities of surplus occurring in scattered locations.

Table 14. - Seasonal variation in milk equivalent of the several dairy products manufactured in the Northeastern States, average of 1933 and 1934

(Daily average for the 2 years = 100)

Month	Milk equivalent of -					
	Ice cream		Cream cheese	Creamery butter	Evaporated milk 2/	American cheese
	Gross	Net 1/				
January	52.3	58.1	111.7	85.7	42.6	42.8
February	48.1	53.9	121.9	70.2	38.0	33.6
March	61.0	70.2	111.6	69.5	80.6	44.2
April	84.6	95.2	101.3	74.0	144.7	74.5
May	142.4	140.5	96.4	114.6	207.0	155.2
June	182.3	201.2	86.4	148.6	231.2	235.4
July	185.2	168.9	84.9	115.8	154.3	170.8
August	155.7	124.6	76.4	112.2	91.0	134.6
September	109.3	92.4	88.0	118.4	83.6	120.8
October	67.6	71.7	105.7	131.4	57.2	100.8
November	55.7	65.2	110.0	83.1	33.7	50.6
December	52.0	55.3	107.4	74.6	33.1	32.8
Year	100.0	100.0	100.0	100.0	100.0	100.0

1/ Excluding estimated quantities of butter and concentrated milk used in ice cream manufacture.

2/ Includes condensed milk and powdered milk.

Source: Computed from special monthly tabulation of Dairy Products Manufactured in the Northeastern States, Bureau of Agricultural Economics.

As indicated in table 14 and figure 6, the manufacture of American cheese and of evaporated milk follows similar seasonal trends with high peaks in May, June, and July, and very low production in winter. The condenseries take relatively more milk than the cheese factories during March, April, and May, and less in the late summer. Nearly all condensery milk in these States is qualified for use as market milk or cream. During the spring months large quantities of surplus milk are transferred from fluid-milk plants to condenseries, while in the late summer and fall, much of the regular supply at the condenseries is required for fluid use.

In the aggregate, large quantities of milk qualified for sale as market milk and cream are used in the production of American cheese, but the major part of the cheese is made from uninspected milk. Cheese factories, therefore, do not stand in the same complementary relationship to the fluid-milk industry of the Northeastern States as do the condenseries.

In 1934, the volume for each of the major uses of milk in the Northeastern States was at the seasonal peak in June, and at, or close to, the lowest level in December (table 15 and figure 7). The only exception is

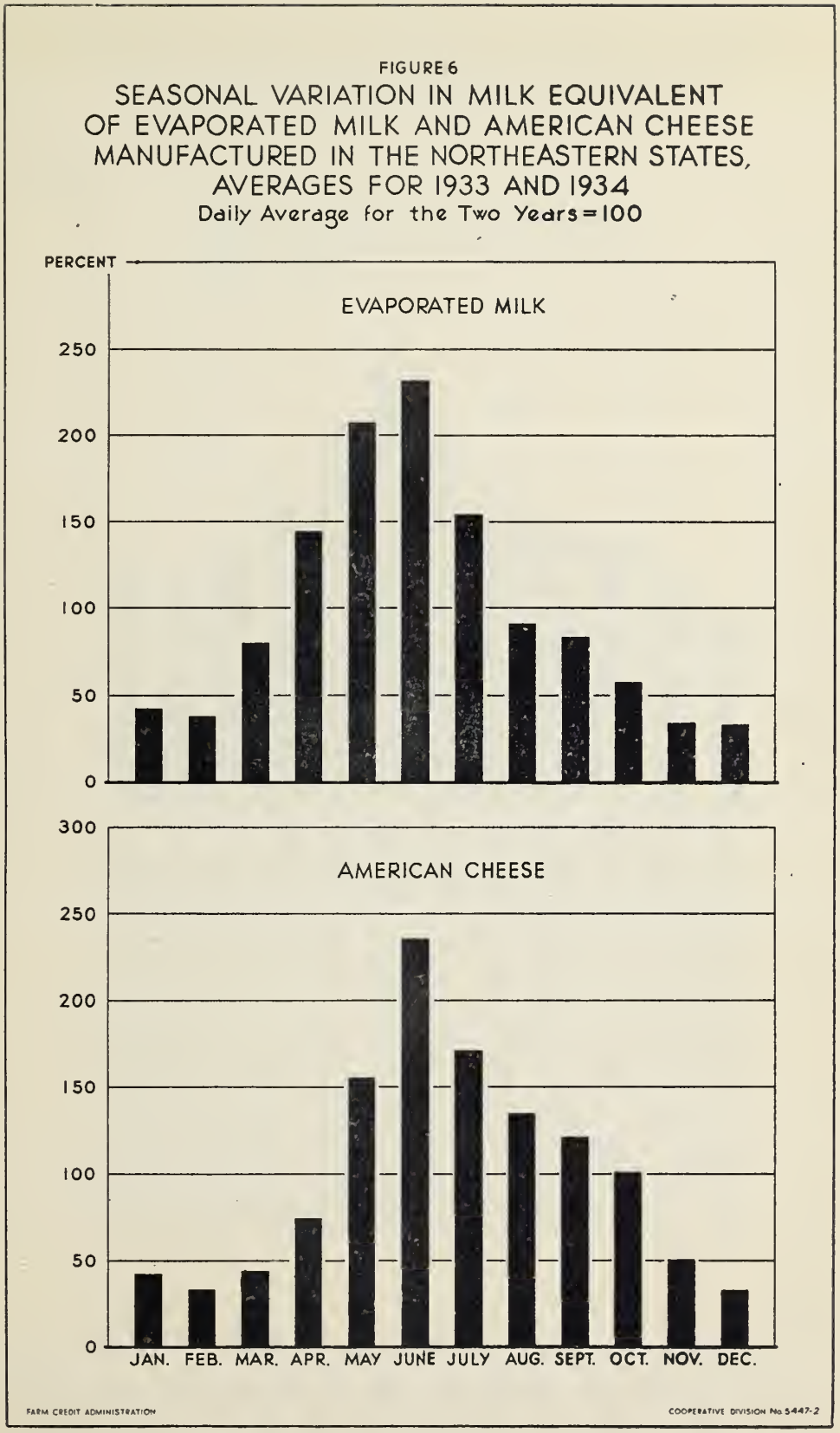

FIGURE 6. – *There is a wide seasonal variation in the manufacture of condensed milk and American cheese, these products being made when there is a large excess of milk over fluid requirements.*

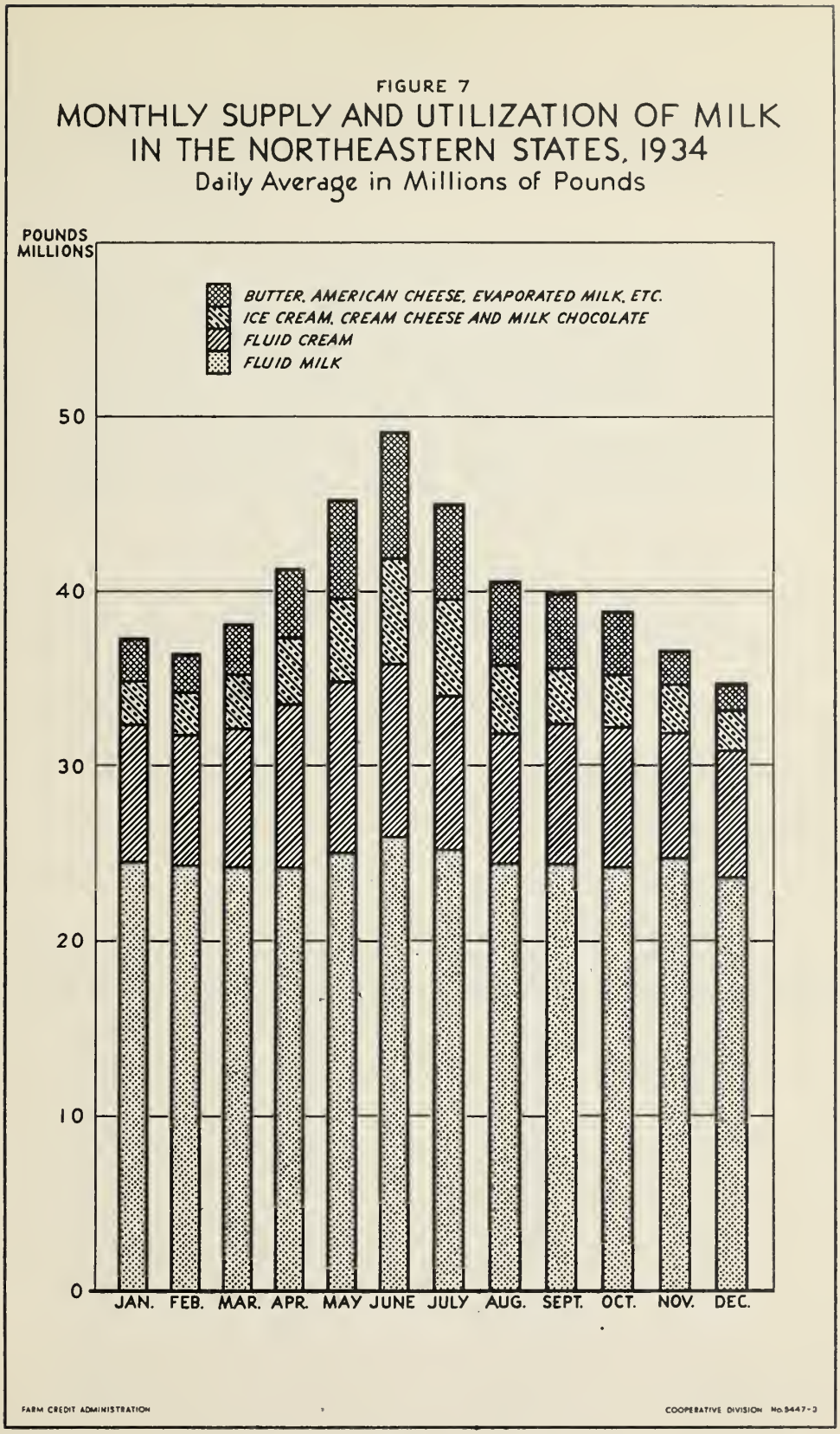

FIGURE 7. – *The volume of milk utilized for each of the major purposes was at the seasonal peak in June and at the lowest level in December. However, slightly less fluid cream was used in November than in December.*

cream for fluid use, the quantity of which was slightly less in November than in December. A part of the normal increase in milk production from December to June is required to supply the greater demand for fluid milk and cream, but the major portion finds its way into ice cream, evaporated milk, and other manufactured dairy products.

When the milk used on farms is left out of consideration, over 80 percent of the remaining supply in the Northeastern States, for 1934, was consumed as fluid milk and fluid cream. Fluid milk alone accounted for 61 percent (table 16). In June, 73 percent of the supply was used as fluid milk and cream, and in November, 87 percent. Milk and cream used in the manufacture of ice cream, cream cheese, and milk chocolate amounted to 12.3 percent of the supply in July, but dropped to 6.8 percent in December and January. Surplus milk converted into butter, American cheese, evaporated milk, and similar products, amounted to 14.9 percent of the supply in June, but only 4.6 percent in December.

Table 15. - Seasonal quantities of milk used for consumption in fluid form and for manufacture in the Northeastern States, 1934 1/

(Daily average for each month, in millions of pounds)

			Net milk equivalent of dairy products manufactured in this area		
Month	Milk for fluid use	Cream for fluid use	Ice cream, cream cheese and milk chocolate	Butter, American cheese, evaporated milk, and similar products.	Total
January	24.5	7.8	2.5	2.5	37.3
February	24.3	7.4	2.5	2.2	36.4
March	24.2	7.9	3.1	2.9	38.1
April	24.2	9.3	3.8	4.0	41.3
May	25.0	9.8	4.7	5.7	45.2
June	25.9	9.9	6.0	7.3	49.1
July	25.2	8.8	5.5	5.5	45.0
August	24.4	7.4	3.9	4.8	40.5
September	24.4	8.0	3.2	4.3	39.9
October	24.2	8.0	3.0	3.6	38.8
November	24.7	7.1	2.8	2.0	36.6
December	23.6	7.2	2.3	1.6	34.7
Year	24.6	8.2	3.6	3.9	40.3

1/ Does not include milk used or manufactured on farms.

Table 16. - Percentage of milk supply of the Northeastern States used for consumption in fluid form and for manufacture, 1934 1/

Month	Milk for fluid use	Cream for fluid use	Net milk equivalent of dairy products manufactured in this area: Ice cream, cream cheese and milk chocolate	Net milk equivalent of dairy products manufactured in this area: Butter, American cheese, evaporated milk, etc.	Total
	Percent	Percent	Percent	Percent	Percent
January	65.7	20.7	6.8	6.8	100.0
February	66.7	20.5	6.9	5.9	100.0
March	63.6	20.8	8.1	7.5	100.0
April	58.6	22.5	9.1	9.8	100.0
May	55.4	21.6	10.4	12.6	100.0
June	52.8	20.2	12.1	14.9	100.0
July	55.9	19.7	12.3	12.1	100.0
August	60.2	18.3	9.6	11.9	100.0
September	61.2	20.1	8.0	10.7	100.0
October	62.3	20.6	7.7	9.4	100.0
November	67.4	19.5	7.6	5.5	100.0
December	67.9	20.7	6.8	4.6	100.0
Year	61.0	20.4	9.0	9.6	100.0

1/ Excluding milk used or manufactured on farms.

Cream Shipped to Principal Markets

As indicated in table 2 of this report, comparatively little milk is separated on farms in the Northeastern States. The small quantity of cream which still is produced and sold by farmers goes mainly to butter factories. A number of dairy plants handling market cream in New England have continued to accept farm-separated cream, but the quantity of such cream has become quite small. However, large quantities of milk are separated at country milk plants in this territory. Most of the cream made at these plants is shipped to the large cities. There it is distributed as table cream or used in the manufacture of ice cream. Relatively small quantities are used in making butter.

Records of the quantities of cream received, and the sources of shipments, are available for only the three largest markets, namely, Boston, New York, and Philadelphia. In 1934, with the consumption of both cream and ice cream at a low level, the milk equivalent of the cream received at these markets was 2,119 million pounds, or about one-eighth of the total milk and cream supply of the Northeastern States.

Table 17. - Milk equivalent of cream shipments from Northeastern and other States to the Boston, New York, and Philadelphia markets, 1930 and 1934

State	Shipments to three markets, combined		Shipments to three markets expressed as a percentage of all milk and cream sold by farmers, 1934	1934 shipments to-		
	1930	1934		Boston	New York	Philadelphia
	Millions of pounds	Millions of pounds	Percent	Millions of pounds	Millions of pounds	Millions of pounds
Maine	83.7	37.2	9.6	37.2	---	---
New Hampshire	25.7	17.2	5.8	17.2	---	---
Vermont	351.5	306.2	26.7	229.7	76.5	---
Massachusetts	7.5	3.5	0.6	2.0	1.5	---
Connecticut	6.5	5.1	0.9	---	5.1	---
New York	1,278.1	1,155.3	18.4	62.5	1,076.1	16.7
New Jersey	15.5	23.8	3.6	---	23.6	0.2
Pennsylvania	264.0	249.7	7.0	0.3	156.5	92.9
Maryland	35.8	18.1	3.1	0.3	0.4	17.4
Delaware	3.8	3.1	2.9	---	0.9	2.2
District of Columbia	---	0.6	---	---	---	0.6
Total, northeastern states	2,072.1	1,819.8	12.7	349.2	1,340.6	130.0
Virginia	25.6	0.2	---	---	---	0.2
West Virginia	1.6	1.1	---	---	---	1.1
Other states	415.2	297.8	---	158.0	38.6	101.2
Total, all sources	2,514.5	2,118.9	---	507.2	1,379.2	232.5

Cream shipments from Vermont to Boston and New York amounted to more than one-fourth the total quantity of milk and cream sold by the farmers of the State (table 17). All three of the large markets received cream from New York State in 1934. The combined quantities received in these markets from New York State were more than one-half the total receipts of the markets from all sources, and nearly one-fifth of the total sales of milk and cream by New York State farmers. In none of the other Northeastern States did the milk equivalent of cream shipped to the three markets amount to as much as 10 percent of the total farm sales of milk and cream. About one-seventh of the total cream receipts at the three markets, in 1934, came from States outside the northeast section, as stated elsewhere in this report.

THE SUPPLY AND USE OF MILK IN THE NORTHEASTERN MILKSHEDS

Markets and Milksheds in the Northeastern States

One of the ways in which the marketing situation for milk differs from that for other commodities is that the various markets draw their milk supplies from well-defined and comparatively limited areas. This is due in part to the fact that milk is very bulky and perishable, therefore cannot be shipped far without excessive cost and deterioration in quality. Sanitary regulations enforced by the municipal and state departments of health also tend to fix definite boundaries for the areas that supply milk to each market or group of markets. Such areas are commonly known as milksheds.

The size of each milkshed is determined by the demands of the consuming population in the market, and by the intensity of milk production in the adjacent farming areas. The intensity of milk production in the several Northeastern States is discussed on page 9 of this report. The population of the several markets in these States gives a rough indication of the quantities of milk required for use as fluid milk and cream. The relative size of the principal cities in this region from the standpoint of population is indicated in figure 1. However, within the areas from which some of these leading cities draw their milk supplies are smaller markets, which add considerably to the population and to the demand for fluid milk and cream.

Primary and Secondary Markets

In the Boston milkshed, for example, are such important cities as Lawrence, Lowell, Springfield, Worcester, Fall River, New Bedford, Providence, and Portland. Prices and other conditions of marketing in these places are dominated by those in the primary market, Boston. The large Boston dealers do business in most or all of them. The New England Milk Producers' Association represents the farmers as bargaining agent there as well as in Boston. Likewise, in the New York milkshed are such important centers as Scranton, Wilkes Barre, Albany, Utica, Syracuse, Rochester, Buffalo, and a number of others. In all of these the Dairymen's League Cooperative Association is the principal representative of the organized dairymen. Prices in these cities are directly related to those in New York City.

The population of the primary metropolitan market and of the secondary markets of 10,000 or more, in each milkshed, is given in table 18. It will be noted that in the Boston milkshed the secondary markets have a total population larger than that of metropolitan Boston. The population of primary and secondary markets in the New York milkshed is equal to that of the other five milksheds combined. There are no secondary markets in the Baltimore or Washington milksheds, and in Connecticut there is no dominant primary market.

As to the places of less than 10,000 population, these are excluded from the present discussion for several reasons. In most of these places a major part of the distribution is handled by producer-dealers. The larger cooperative associations which represent farmers in collective bargaining and other activities in the principal markets usually are not active in the smaller towns. Finally, since the supply of milk for the smaller markets is, as a rule, closely adjusted to the demand, surplus milk is not a serious problem with them.

Table 18. - Population of primary market and secondary markets of 10,000 or more population in each milkshed, 1930

Milkshed	Primary (metropolitan) market	Secondary markets of 10,000 population or more	Total
Boston	1,998,000	2,649,000	4,647,000
Connecticut	---	1,082,000	1,082,000
New York	10,600,000	3,300,000	13,900,000
Philadelphia	2,231,000	1,448,000	3,679,000
Baltimore	1,200,000	---	1,200,000
Washington	621,000	---	621,000
Total	16,650,000	8,479,000	25,129,000

Source: From U. S. Census of Population, 1930. Bureau of the Census, U. S. Department of Commerce.

Extent and Boundaries of the Milksheds

The extent and approximate boundaries of the several milksheds in the Northeastern States are shown in figure 8. The Boston milkshed occupies nearly all of New England, with the exception of northern Maine, part of the western side of Vermont, and most of Connecticut. It also occupies two small areas in New York State, one just north of Troy, the other in Clinton County, along the Canadian border.

The New York milkshed takes in practically all of New York State, also several counties along the west side of Vermont, a little territory in western Massachusetts and Connecticut, the northern section of New Jersey, and about two-thirds of Pennsylvania. The New York and Boston milksheds overlap in western Vermont and eastern New York, also in northern New York. In these areas neighboring farms supply milk to different markets. With changes in prices and transportation rates, some of the country milk plants in those areas have shifted their sales outlets from one market to the other.

The Connecticut milkshed lies between the Boston and New York sheds. It occupies most of the State of Connecticut, excluding the northeast portion. It also takes in a small area in southeastern New York. The Connecticut and New York milksheds overlap at this point, and also in western Connecticut.

The Philadelphia milkshed (figure 8) occupies about one-third of Pennsylvania, principally the southeast portion, the southern half of New Jersey, all of Delaware, the eastern shore and a strip into western Maryland and Virginia and northeastern West Virginia. A few country plants whose chief product is cream are maintained by Philadelphia dealers in northwestern Pennsylvania. The milksheds of Philadelphia and New York overlap throughout much of northwestern, central, and southeastern Pennsylvania.

The Baltimore milkshed is very compact. It lies mostly to the north and west of Baltimore, extending into southern Pennsylvania, principally York County. In southern Pennsylvania, Baltimore competes with both Philadelphia and New York for its milk supply.

The Washington milkshed also is rather small and compact. About two-thirds of it lies across the Potomac in northern Virginia, one-third in Maryland, west of Baltimore. A small group of dairymen sending milk to Washington are located north of Baltimore, directly within the Baltimore milkshed.

The Pittsburgh milkshed, which is outside the territory that receives chief attention in this report, occupies a number of counties of western Pennsylvania and eastern Ohio. Pittsburgh competes, to a limited extent only, with Philadelphia and New York in the extreme northwest portion of Pennsylvania.

For the most part, these milkshed boundaries were the same in 1934 as they had been for 20 years. However, a few important changes have occurred. In the past several years the boundary between the Boston and New York sheds has moved eastward. More of the milk produced in western Vermont and eastern New York now goes to the New York market and less to Boston. One reason for this is the fact that Boston and other New England markets now get a large share of their cream supply from the West. This takes the place of cream formerly supplied by farms in New England and the Province of Quebec. Furthermore, it appears that the Boston dealers made a more prompt and vigorous effort to keep the local supply of milk in line with the demand during the period of increasing production and decreasing consumption following 1928 or 1929.

The New York milkshed also has expanded considerably in central and southern Pennsylvania. The development in the central part of the State consisted mainly in bringing under New York City inspection farms which previously had been producing milk only for manufacture. In the southern part of the State, however, several thousand farms, formerly

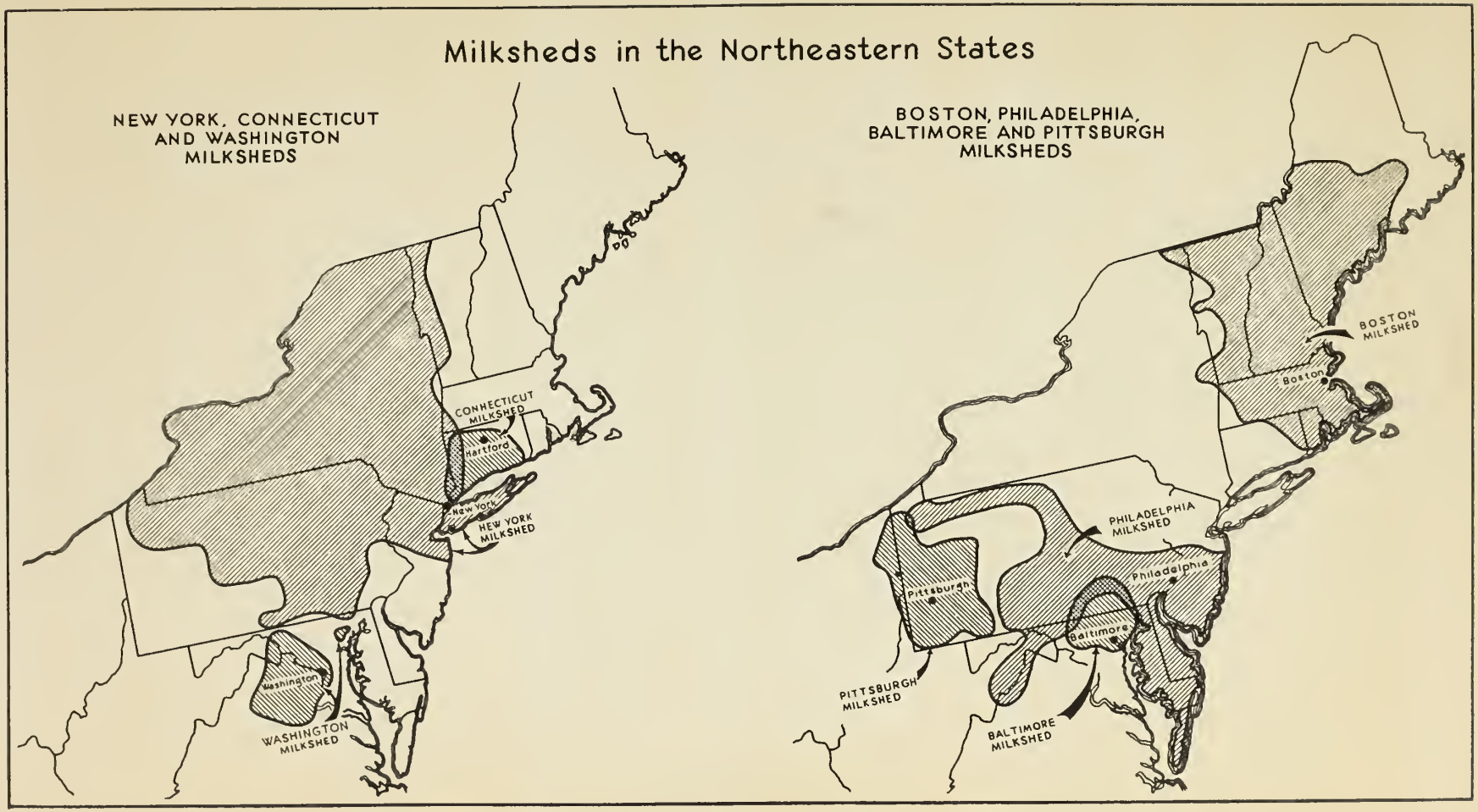

FIGURE 8. - *The size of the milksheds depends upon the demand of the market and the intensity of production within the area. Milksheds of the metropolitan districts frequently overlap.*

supplying fluid milk to Philadelphia dealers, shifted to New York. This change began early in 1930, with the adoption by the City of Philadelphia of an ordinance excluding milk from dairy herds not free from tuberculosis. It was encouraged and facilitated by the development of economical and dependable long-haul trucking of milk. Most parts of the areas mentioned have a shorter haul to New York by highway than by rail. Furthermore, while the hauling distance from some of these localities is greater to New York than to Philadelphia, yet they are nearer to New York than many places that have been shipping fluid milk to that market for years.

Beginning about 1926, the Philadelphia market, like Boston, began to get a large share of its cream supply from the West. For this reason, and because of increased local production and sharply reduced consumption after 1928 or 1929, Philadelphia was able to release part of her milkshed without difficulty.

Milk Supply and Disposal

Sources of Information

From the foregoing it is obvious that the milkshed boundaries do not correspond to those of the States, counties, or other political divisions. In many counties where milksheds join or overlap, milk is supplied to two or more of the primary markets, or to markets secondary to them. On the other hand, the statistics pertaining to the production and utilization of milk, which are compiled and published by the U. S. Department of Agriculture, the various State departments of agriculture, and similar agencies, are available only on a State-wide or county basis. Consequently in order to obtain a complete statistical summary of the supply and use of milk in the several milksheds, the figures already compiled by these departments must be supplemented by direct information from dealers, cooperative associations, and individuals familiar with conditions in each milkshed. The data here presented have been compiled in this manner.

Number of Producers

The total number of farmers supplying milk to the primary and secondary markets in the six northeastern milksheds, in 1934, was approximately 154,000. About half of these producers were members of the principal cooperative bargaining associations in the several milksheds. Less than 5 percent of the total number were distributing their own milk. Nearly half the farmers who were selling milk to dealers were not represented in the principal bargaining associations, although a considerable proportion of them were members of other cooperative groups (table 19). In the Baltimore and Washington milksheds, 90 percent or more of the producers were members of the cooperative, but members of the principal cooperative in the Philadelphia, Connecticut, and New York sheds constituted less than half the total number of producers. In Connecticut, about 30 percent of the market milk producers were producer-dealers, but in the other milksheds this group was much less important.

Seventy percent of the producers supplied the primary markets such as Boston, New York and Philadelphia (table 20). The other 30 percent supply secondary markets in the six milksheds (table 21). In general the leading cooperative bargaining associations were less strongly represented in the secondary markets. Their membership constituted only 35 percent of the total number of producers supplying those markets. Producer-dealers were a greater factor in the secondary markets, where they constituted about 11 percent of the total number of producers.

Table 19. - Approximate Number of Farmers Producing Milk for the Primary (Metropolitan) Market and Secondary Markets of 10,000 or More Population in Each Milkshed, 1934

Milkshed	Members of the principal cooperative	Producer-dealers	Others	Total
Boston	21,200	2,400	6,900	30,500
Connecticut	2,800	1,900	1,800	6,500
New York	39,500	1,500	50,000	91,000
Philadelphia	7,800	500	12,800	21,100
Baltimore	3,500	20	200	3,720
Washington	1,140	19	140	1,299
Total	75,940	6,339	71,840	154,119

Estimates of Fluid Sales and Surplus

The volume of milk and milk equivalent of cream handled by milk dealers in the six milksheds was approximately 410,000 forty-quart cans daily in June, and 290,000 cans daily in November, 1934 (table 22). Considerably more than half this volume was handled by dealers in the New York milkshed.

It has been indicated that in this northeast region the seasonal peak of milk production occurs regularly in June, and that as a rule the low point comes in November. Taking the six milksheds as a group, the total volume in November was 70 percent as much as in June. In the New York milkshed, November production was only 62 percent as much as in June, while in each of the other five sheds, the November-June ratio was 82 percent or higher.

The milk supplies for secondary markets showed less seasonal variation than those for the large primary markets. The total November supply for secondary markets in the six milksheds was 85 percent of their June supply.

Fluid milk sales in the six milksheds dropped only 5 percent from June to November, but cream sales dropped one-third. The quantity of milk used for manufacture was only one-fourth as much in November as in June.

In June, 58 percent of the supply in the six milksheds was utilized as fluid milk, 20 percent as cream, and 22 percent for manufacture. In November, 69 percent of the supply was used as fluid milk, 19 percent as cream, and only 12 percent for manufacture (table 23). There were wide differences in the use of milk in the several milksheds. The percentage of total supply used as fluid milk in June varied from 47 percent in New York to 62 percent in Boston, Connecticut, and Philadelphia. The percentage used for manufacture varied from 10 percent in the Boston milkshed to 32 percent in the New York shed. In November, however, New York was near the top in the proportion of total supply used as fluid milk. Connecticut used as large a proportion of its milk for manufacture in November as in June.

It is noticeable that Boston used a very large proportion of its supply as cream, a very small proportion for manufacture. The records indicate that the people of Boston are large consumers of cream. Also the fact that Boston has an "open" cream market enables the dealers in that market to supplement their local supplies at any time by outside purchases, so that there is no necessity of carrying a surplus locally to insure against a possible shortage. Philadelphia, on the other hand, used a very small proportion of its supply as fluid cream. Apparently cream consumption in that market is rather low.

Table 20. - Approximate number of farmers producing milk for the primary (metropolitan) market in each milkshed, 1934.

Milkshed 1/	Members of the principal cooperative	Producer-dealers	Others	Total
Boston	14,200	400	3,400	18,000
New York	33,500	700	38,800	73,000
Philadelphia	7,100	100	4,600	11,800
Baltimore	3,500	20	200	3,720
Washington	1,140	19	140	1,299
Total	59,440	1,239	47,140	107,819

1/ Hartford and New Haven are the principal markets in the Connecticut milkshed, but since there is not a clear distinction between primary and secondary markets in that area, all are grouped under the heading of secondary markets.

Table 21. - Approximate number of farmers producing milk for the secondary markets of 10,000 or more population in each milkshed, 1934

Milkshed 1/	Members of the principal cooperative	Producer-dealers	Others	Total
Boston	7,000	2,000	3,500	12,500
Connecticut	2,800	1,900	1,800	6,500
New York	6,000	800	11,200	18,000
Philadelphia	700	400	8,200	9,300
Total	16,500	5,100	24,700	46,300

1/ There are no secondary markets in the Baltimore and Washington milksheds.

Table 22. - Supply and disposal of milk handled by fluid milk dealers in primary and secondary markets of the six northeastern milksheds, June and November, 1934 1/

Milkshed	Milk used daily for -			
	Fluid milk	Fluid cream	Manufacture	All purposes
	40-quart cans	40-quart cans	40-quart cans	40-quart cans
June 1934:				
Boston	45,400	20,600	7,300	73,300
Connecticut	10,100	3,300	2,900	16,300
New York	120,000	53,000	82,500	255,500
Philadelphia	29,300	6,300	11,600	47,200
Baltimore	5,300	1,700	2,100	9,100
Washington	4,700	1,800	2,000	8,500
Total	214,800	86,700	108,400	409,900
November 1934:				
Boston	43,300	15,600	3,100	62,000
Connecticut	9,800	2,200	2,500	14,500
New York	113,800	31,200	14,800	159,800
Philadelphia	29,000	6,200	3,500	38,700
Baltimore	5,000	1,400	1,100	7,500
Washington	4,600	1,500	1,200	7,300
Total	205,500	58,100	26,200	289,800

1/ Includes milk handled in condenseries and other manufacturing plants approved for city milk supply.

Table 23. - Percentage of milk supply utilized for fluid milk, fluid cream, and manufacture in the northeastern milksheds, June and November, 1934

Milkshed	Percentage of total supply used for -			
	Fluid milk	Fluid cream	Manufacture	All purposes
	Percent	Percent	Percent	Percent
June 1934:				
Boston	62	28	10	100
Connecticut	62	21	17	100
New York	47	21	32	100
Philadelphia	62	13	25	100
Baltimore	58	19	23	100
Washington	55	21	24	100
Average	58	20	22	100
November 1934:				
Boston	70	25	5	100
Connecticut	68	15	17	100
New York	71	20	9	100
Philadelphia	75	16	9	100
Baltimore	67	18	15	100
Washington	64	20	16	100
Average	69	19	12	100

Source: These percentages are based on the quantities given in table 22.

Table 24. - Percentage of supply furnished by members of the leading cooperative association, producer-dealers, and other producers in each milkshed, which was utilized as fluid milk, June, 1934

Milkshed	Percentage of milk supplied by each group, which was utilized as fluid milk			
	Members of the leading cooperative association	Other producers selling to dealers	Producer-dealers	All producers
Boston	62	45	88	62
Connecticut	62	47	88	62
New York	37	55 1/	--- 2/	47
Philadelphia	69	56	89	62
Baltimore	58	56	81	58
Washington	58	42	90	55
Average	58	50	87	58

1/ Includes producer-dealer volume. If this were not included, the percentage of supply utilized as fluid milk would be about 53 percent.

2/ Not available as a separate item.

In the secondary markets a larger proportion of the supply was used as fluid milk and a smaller proportion as cream. Taking these markets as a group, in June, 70 percent of the supply was used as fluid milk, 17 percent as cream. In November, 80 percent was used as fluid milk, 13 percent as cream.

The proportion of total supply utilized as fluid milk was higher for the producer-dealers than for members of the leading cooperatives or other producers selling milk to dealers. In the several milksheds, producer-dealers disposed of 81 to 90 percent of their supply as fluid milk (table 24). In all except the New York milkshed, the percentage of total supply utilized as fluid milk, in June, was higher for members of the leading cooperative associations than for the other producers selling their milk to dealers (table 24). In the Boston milkshed, for example, 62 percent of the milk supplied by members of the New England Milk Producers' Association was used as fluid milk, while only 45 percent of the milk supplied by other producers (not including producer-dealers) was so used. On the other hand, only 37 percent of the milk supplied by members of the Dairymen's League, in June, was utilized as fluid milk, while the so-called "independent" producers enjoyed fluid milk outlets for 55 percent of their supply. At other seasons, the differences in utilization were not so great. It also is true that the Dairymen's League has increased somewhat its proportion of fluid milk sales in the past two years.

WESTERN CREAM

While chief attention, in this report, is given to the utilization of milk and cream produced in the Northeastern States, supplies coming to the eastern markets from outside sources should not be ignored. Those supplies compete with, and help to determine the price of the milk and cream produced locally. Changes in the price, volume, and quality of outside supplies also affect the amount and uses of surplus milk in these northeastern milksheds.

Demand for Western Cream in Eastern Markets

Cream is much less bulky than whole milk, that is, it occupies less space, and weighs less per unit of value. Cream for shipment usually contains 40 percent butterfat, or 33 pounds of butterfat per 40-quart can; that is, the equivalent of the butterfat contained in 11 cans of ordinary milk. In the terminal markets a can of cream usually has from four to six times the value of a can of milk, yet the transportation charge for an equal distance is only one-fourth greater. Consequently the supply areas for market cream are in general more extensive than those for milk.

It was not until the early nineteen twenties that there was any need or inducement for the eastern cities to go further than the outskirts of the milk-shipping zone for extra cream. However, in the decade following the World War there was a remarkable increase in the

demand for fluid milk and cream. Milk production in the dairy States of the Northeast did not keep pace with the growing market. In fact, the quantity of milk produced on farms in the 12 Northeastern States in 1929 was only 5 percent greater than the production in 1919. A low point in the cycle of cow numbers occurred in 1927. Market milk dealers and cooperatives rapidly took over the adjacent territory which had been occupied previously by condenseries, or cheese and butter factories. They expanded into the Canadian provinces of Ontario and Quebec, whose shipments of cream and milk to United States markets showed a striking increase up to 1926. In that year more strict sanitary regulations were adopted for dairies and dairy plants exporting milk or cream to the United States. Three years later the import duties were increased by 50 percent, and still higher rates were established in 1930. In 1935 the imports of milk and cream from Canada were only negligible quantities.

Receipts of Western Cream at New York, Boston, and Philadelphia

As early as 1924, and probably earlier, shipments of cream to New York and other eastern markets from such States as Wisconsin, Illinois, Minnesota, Michigan, Ohio, Indiana, and Iowa had reached substantial proportions. 4/ The comparatively short supplies in the East from 1925 to 1929, and prices for sweet cream that were high relative to butterfat prices, especially from 1929 to 1932, encouraged the growth of the western cream trade down to 1932.

Reports of cream receipts at the New York market, by States of origin, were begun by the Bureau of Agricultural Economics in 1927. Similar reports were initiated at Philadelphia in 1929 and at Boston in 1930. The receipts of fresh cream at the three markets, originating in States west of the Pennsylvania-Ohio line, amounted in 1930 to 204,000 forty-quart cans (table 25). This is equivalent to 12,000 cans of whole milk daily. The Boston receipts were very low that year due to an embargo on outside cream by the City Department of Health.

Arrivals of western cream at Boston increased from 59,000 cans in 1930 to 211,000 in 1933. In 1934 they dropped off to 178,000 cans. Philadelphia has taken a steadily decreasing quantity of western cream each year since 1930. In 1934 the receipts were 114,000 cans, or less than half as much as in 1930. The New York market uses relatively little cream from the West. This is due to the fact that New York City, which constitutes the major part of this market, permits the entry of cream from inspected dairies only, and inspection has not been extended beyond the western boundaries of New York State and Pennsylvania.

4/ Farm Economics, Cornell University, No. 30, December 1925, p. 368.

Table 25. - Receipts of cream from Midwestern and Southern States at Boston, New York, and Philadelphia, 1927-1934

Year	Receipts at - Boston	New York	Philadelphia	Total
	40-quart units	40-quart units	40-quart units	40-quart units
1927	32,500 1/	53,961		
1928	82,500 1/	86,073		
1929	155,000 1/	125,760	285,058 2/	
1930	58,996	77,235	265,719	401,950 2/
1931	163,739	49,631	221,191	434,561
1932	195,323	83,909	173,401	452,633
1933	211,355	79,341	150,343	441,039
1934	178,373	43,524	114,182	336,079

1/ From New England Milk Producers' Association.
2/ No earlier data available.

Source: Reports of the Bureau of Agricultural Economics, U. S. Department of Agriculture, includes shipments originating at all points west of the Pennsylvania-Ohio line.

Receipts of western cream at the three large markets in 1934 were 23 percent less than in 1930. This does not appear to be a permanent change. As the demand for milk and cream in the eastern cities, and the relation of cream prices to freight rates return to a more nearly normal basis, a substantial increase in sales of western cream in the eastern markets may be expected. This tendency will be aided by the downward trend in cow numbers which began in 1934.

According to the U. S. Department of Agriculture, shipments of fresh cream from Western and Southern States to the three large markets in 1934 constituted 14.2 percent of their total receipts, compared with 15.6 percent in 1931 (table 26). Boston is now the leading market for western cream, 30 percent of her total cream supply in 1934 having originated in the Western or Southern States.

Marked differences among these markets may be noted in respect to the relative quantities of cream received from the several Western and Southern States. For example, in 1934, Boston received nearly as much cream from Michigan as from Wisconsin, while the Michigan shipments to Philadelphia were less than one percent of those from Wisconsin. Tennessee was one of the leading suppliers of cream to Boston, but none was shipped to Philadelphia from that State. Ohio was the leading source of outside cream for the north Jersey markets (part of the New York Metropolitan Area) but ranked fourth in Boston and third in Philadelphia. To a considerable extent these differences are due to corporate

Table 26. - Origin of shipments of western cream to eastern markets, July 1933 to June 1934
(40-quart units)

State of origin	Destinations										
	Boston	Connecticut	Rhode Island	New York market	New York upstate	Philadelphia	Other Pennsylvania	Maryland	Washington	Other markets	Total
Michigan	48,200	17,600	—	600	12,400	1,400	5,649	200	4,800	9,300	100,149
Ohio	15,400	—	—	30,400	6,000	13,017	2,400	—	4,800	1,600	73,617
Indiana	18,400	1,650	400	20,518	14,200	27,292	4,094	152	4,600	6,204	97,510
Illinois	2,400	600	200	1,000	2,000	600	200	—	400	550	7,950
Wisconsin	46,048	1,600	—	16,200	11,400	72,060	7,400	6,248	3,190	9,900	174,046
Minnesota	19,800	—	—	—	200	4.144	2,370	—	200	400	27,114
Missouri	17,000	600	—	200	1,000	4,715	800	—	2,200	2,450	28,965
Kansas	4,400	—	—	—	200	—	—	—	—	200	4,800
Texas	—	—	—	—	1,200	400	200	—	—	—	1,800
Others 1/	15,038	3,052	10,911	7,202	8,200	200	—	6,159	—	1,748	52,510
Total	186,686	25,102	11,511	76,120	56,800	123,828	23,113	12,759	20,190	32,352	568,461

1/ West Virginia, Kentucky, Tennessee and Mississippi. Data combined to avoid disclosure of quantities for individual shippers.

Source: Based on reports supplied by the railroads listed under table 23.

affiliations and to the trade contacts that happen to have been made between important shippers and receivers of cream. Apparently the distances and costs of transportation have not been the primary consideration.

Receipts at Smaller Markets

While Boston, New York, and Philadelphia, because of their size, are by far the most important markets for western cream in the East, there are many smaller places that receive direct shipments from the West. In the aggregate the receipts at these smaller markets are large. In the year ending June 30, 1934, the shipments of cream from Western and Southern States to places in the Northeast, outside the three metropolitan markets, amounted to 181,000 forty-quart cans, or nearly as much as the receipts at Boston (table 27). Among these smaller markets, the most important, as receivers of western cream, are the upstate cities in New York State and Pennsylvania, several cities in Connecticut, and the City of Washington, D. C.

Origin of Shipments

During the past two years, 12 States west of the Pennsylvania-Ohio line have shipped cream to destinations in the 12 Northeastern States. The largest shippers have been Wisconsin, Michigan, Indiana, Ohio, and Tennessee (tables 28 and 29). Since 1930, Michigan shipments have increased more than those of any other State. Most of this cream comes from the dairy section west and south of Detroit. An abnormal surplus in that area has been caused by the striking decrease in demand for milk and cream in the cities where the automobile and related industries predominate. Michigan shippers also have the advantage of relatively low freight rates to the eastern cities.

Some of the most distant shippers have either reduced their shipments or have dropped out altogether. In 1929, Minnesota shipped about 67,000 cans of cream to New York and Philadelphia, but in 1934, only 1,990 cans of Minnesota cream were received at these cities. A part of this decrease is offset by shipments of 80 percent cream and frozen cream, which do not move in the passenger train service and for which the quantities are not recorded by States of origin. Among the States that have discontinued the shipping of fresh cream to the northeastern markets, or nearly so, are: Alabama, Arkansas, Iowa, Kentucky, Mississippi, Oklahoma, and Texas. The decline in cream prices without a corresponding reduction in freight rates, and difficulties experienced in meeting the quality requirements of eastern buyers are the main reasons for the reduction of shipments from these more distant States.

Seasonal Variation in Shipments

Inasmuch as western cream is purchased by eastern dealers to supplement their supplies from local sources, it might be expected that the height of the movement would occur in the late summer and fall when

Table 27. - Receipts of western cream at all markets in the Northeastern States, June 1932 to June 1934

Market	Receipts				
	July 1932 to June 1933	July 1933 to June 1934	June 1932	June 1933	June 1934
	40-quart units	40-quart units	40-quart units	40-quart units	40-quart units
Boston market	209,870	186,686	9,417	14,600	9,487
Other Massachusetts and northern New England	10,400	15,404	200	200	800
Connecticut	22,902	25,102	2,060	2,417	3,000
Rhode Island	22,034	11,511	---	---	200
New York market (mostly North Jersey)	102,401	76,120	13,436	11,923	7,990
New York - Upstate	52,014	56,800	11,700	6,000	10,200
New Jersey (outside New York and Philadelphia markets)	4,050	2,700	200	---	800
Philadelphia	151,126	123,828	20,109	13,878	11,431
Other Pennsylvania	20,387	23,113	6,000	4,200	5,794
Maryland (mostly Baltimore)	5,730	12,759	300	1,425	838
Delaware	4,951	3,248	1,085	1,200	200
Washington, D. C. (including Alexandria, Va.)	9,500	21,590	800	2,000	3,200
Virginia (mostly Richmond)	3,200	9,600	200	1,200	1,000
Total	618,565	568,461	65,507	59,043	54,940

Source: Based on reports supplied by the following railroads: Baltimore and Ohio; Chesapeake and Ohio; Delaware, Lackawanna and Western; Erie; Lehigh Valley; Grand Trunk Western; New York Central; and Pennsylvania. Practically all shipments of cream coming into the Northeastern States are handled by one of these lines, although other lines often share in the joint-haul. Includes shipments originating at all points west of the Pennsylvania-Ohio line.

the local supplies are least ample in relation to the demands for fluid milk and cream. This, however, is not the case. As indicated in table 30, the period of largest shipments of western cream is from May to September. During the four years 1930-33, the quantity shipped each month from October to January was only about half as great as that shipped in August. The fact that the shipments are greater during the summer suggests that a large part of the western cream is taken by ice cream manufacturers, whose requirements for milk fat and solids are greatest at that season.

Freight Rates

Most of the cream is shipped in 40-quart cans and moves in passenger train service. The only important exceptions are the tank-car shipments which were made for a time by the Michigan Producers' Dairy Company of Adrian, Michigan, and shipments of 80 percent cream and

Table 28. - Origin of cream shipped from Midwestern and Southern States to markets in the Northeast, June 1932 to June 1934

State of origin	Number of shipping points	Quantity Shipped				
		July 1932 to June 1933	July 1933 to June 1934	June 1932	June 1933	June 1934
		40-qt. units	40-qt. units	40-qt. units	40-qt. units	40-qt. units
Michigan	13	92,800	100,149	9,400	9,400	9,400
Ohio	13	74,677	73,617	10,562	6,239	7,790
Indiana	15	122,622	97,510	15,327	7,995	9,141
Illinois	6	12,892	7,950	2,000	---	---
Wisconsin	28	195,108	174,046	18,976	22,392	20,422
Minnesota	3	17,838	27,114	205	5,200	1,000
Missouri	5	42,741	28,965	3,224	2,400	1,900
Kansas	3	11,600	4,800	---	---	---
Texas	2	---	1,800	---	---	200
Others 1/	8	48,287	52,510	5,813	5,417	5,687
Total	96	618,565	568,461	65,507	59,043	54,940

1/ West Virginia, Kentucky, Tennessee and Mississippi. Data combined to avoid disclosure of quantities for individual shippers.

Source: Based on reports supplied by the railroads listed under table 23.

frozen cream in freight train and boat service, especially by the Land O'Lakes Creameries of Minneapolis. The rates on fresh cream, of course, vary with the distance. On actual shipments of cream in 40-quart cans, passenger train service, made during the year ending June 1934, the lowest charge was 56 cents for shipments from Columbus, Ohio, to Pittsburgh, Pennsylvania (table 31). The highest charge was $2.235 per can for shipments between Dallas, Texas, and Boston, Massachusetts. Large quantities moved at a cost of $1.95 per can and higher. In comparison, the carload rates on cream from the outer zones of the New York milkshed to New York City (300 to 500 miles) are from 50 cents to 60 cents per can. However, relatively little local cream is shipped in carloads. The rates on l.c.l. shipments are greater by one-seventh.

The difference in freight cost, comparing carload shipments of cream made from Wisconsin with l.c.l. shipments from the outer limits of the eastern milksheds, is approximately $1.10 a can. This is equivalent to a difference of 10 cents per 100 pounds in the net return on the milk separated for cream, or 3-1/3 cents per pound of butterfat. In warm weather there is also some extra expense for icing the western shipments. Low prices have stimulated the shippers to look for ways of reducing transportation costs. So far this has been accomplished in a limited way by shipping in tank cars, which take a lower rate and require no icing;

Table 29. - Cream shipments to Boston, New York and Philadelphia by the several Midwestern and Southern States, 1927-1934
(40-quart units)

State of origin	Shipments to New York		Shipments to New York and Philadelphia	Shipments to Boston, New York and Philadelphia						
	1927	1928	1929	1930	1931	1932	1933	1934	July 1932 to June 1933	July 1933 to June 1934
Michigan	4,813	2,920	2,606	27,514	26,829	33,204	46,702	51,715	42,615	41,728
Ohio	1,800	11,170	56,939	62,944	59,083	54,503	54,623	50,189	49,023	54,090
Indiana	2,935	7,794	71,543	88,392	124,325	120,253	84,352	38,671	97,184	54,641
Illinois	953	2,688	4,741	3,970	4,000	16,423	6,213	3,221	10,380	2,803
Wisconsin	24,720	16,549	121,113	124,179	136,371	154,521	160,672	138,955	148,799	132,755
Minnesota	7,568	11,599	66,882	32,941	15,836	1,601	27,807	11,289	12,489	21,406
Iowa	10,962	23,117	8,096	192	---	---	---	---	---	---
Missouri	---	2,269	33,930	27,785	28,521	46,502	35,512	17,390	40,472	22,698
Kansas	---	---	2,600	2,668	2,495	5,165	7,975	2,000	7,140	4,400
Oklahoma	---	---	1,673	1,450	---	---	---	---	---	---
Texas	---	---	1,742	1,948	1,145	400	200	---	---	200
Kentucky	---	200	12,720	6,222	7,410	3,742	---	---	2,840	---
Tennessee	210	7,767	19,667	18,491	22,382	16,319	16,983	22,449	12,269	18,520
Alabama	---	---	---	---	4,859	---	---	200	---	---
Mississippi	---	---	---	217	---	---	---	---	---	---
Arkansas	---	---	6,566	3,037	1,305	---	---	---	---	---
Total	53,961	86,073	410,818	401,950	434,561	452,633	441,039	336,079	423,211	353,241

Source: From reports of the Bureau of Agricultural Economics, U. S. Department of Agriculture. Includes all shipments to these markets from points west of the Pennsylvania-Ohio line.

Table 30. - Seasonal variation in western cream shipments

	1933 shipments as reported by railroads		Receipts at Boston, New York and Philadelphia as reported by U.S. Department of Agriculture, 1930-1933	
	Daily average	Percentage of daily average for year	Daily average	Percentage of daily average for year
	40-quart cans	Percent	40-quart cans	Percent
January	1,204	69	854	72
February	1,797	102	1,114	94
March	1,526	87	1,159	98
April	1,725	98	1,060	90
May	2,244	128	1,563	132
June	1,968	112	1,246	105
July	2,383	136	1,563	132
August	3,751	214	1,778	150
September	1,733	99	1,280	108
October	894	51	823	70
November	901	51	871	74
December	926	53	880	74
Year	1,756	100	1,184	100

by shipping the cream in frozen form, which is less perishable and can be moved by a slower and less expensive class of service; and by shipping "super" cream, which contains 80 percent butterfat and is both less perishable and less bulky than ordinary cream.

Table 31. - Freight rates on actual shipments of cream from stations in the Midwestern and Southern States to important markets in the Northeast
(Corrected to December 13, 1935)

Point of origin	Destination														
	Buffalo, N. Y.	Binghamton, N. Y.	Albany, N. Y.	Jersey City, N. J.	Springfield, Mass.	Hartford, Conn.	Boston, Mass.	Providence, R. I.	Pittsburgh, Penn.	Harrisburg, Penn.	Philadelphia, Penn.	Scranton, Penn.	Baltimore, Md.	Washington, D. C.	Richmond, Va.
Fresh cream in 40-quart cans, passenger train service (dollars per can):															
Michigan:															
Detroit	0.61	0.815	1.03	0.98	0.98		1.07		0.66		0.97				
Adrian	0.68	0.875		1.05	1.05	1.05	1.115		0.63	0.875	0.97			0.94	1.025
Homer	0.705		1.12			1.085			0.735	1.00					
Pinconning	0.705			1.065			1.15			0.98	1.085				
Ohio:															
Barnesville	0.68														
Toledo	0.66	0.86		1.015			1.105			0.845	0.945	0.915		0.905	1.015
Orrville	0.60						1.115				0.84				
Columbus	0.69	0.865		0.97			1.13		0.56		0.895			0.86	0.915
Indiana:															
Bluffton	0.76	0.95	1.02	1.085			1.105		0.69	0.94	1.015			0.97	1.07
Lebanon	0.825				1.17	1.17	1.25		0.745	0.98	1.065	1.04		1.025	
Shelbyville	0.825	1.005		1.115			1.25		0.73		1.04		1.00	0.98	1.00
Illinois:															
Chicago		1.05		1.20							1.29	1.105			
Vandalia	0.99	1.15		1.26			1.375		0.905		1.195			1.155	1.165
Wisconsin:															
Fond du Lac	1.275	1.44		1.59			1.685		1.215		1.52		1.495	1.475	1.57
Clintonville							1.725	1.735			1.56				
Antigo							1.775				1.61				
Bruce							1.875				1.71			1.665	1.735
Minnesota:															
Minneapolis	1.485	1.65	1.75	1.80	1.835		1.895		1.425		1.73			1.685	1.78
Hutchinson											1.97			1.925	
Missouri:															
St. Louis	0.83	1.215		1.31	1.355	1.355	1.425		0.965		1.25	1.22		1.195	1.215
Springfield				1.91			2.025				1.73	1.82		1.685	
Kansas:															
Ottawa	1.22	1.605		1.70			1.815		1.355		1.64			1.585	1.605

Table 31.- (Continued) Freight rates on actual shipments of cream from stations in the Midwestern and Southern States to important markets in the Northeast (Corrected to December 13, 1935)

Point of origin	Destination														
	Buffalo, N. Y.	Binghamton, N. Y.	Albany, N. Y.	Jersey City, N. J.	Springfield, Mass.	Hartford, Conn.	Boston, Mass.	Providence, R. I.	Pittsburgh, Penn.	Harrisburg, Penn.	Philadelphia, Penn.	Scranton, Penn.	Baltimore, Md.	Washington, D. C.	Richmond, Va.
Fresh cream in 40-quart cans, passenger train service (dollars per can) - continued:															
Texas:															
Dallas	1.64	2.025		2.12			2.235		1.775		2.06			2.005	2.025
West Virginia:															
Wheeling				0.865							0.89				
Kentucky:															
Mayfield							1.93								
Tennessee:															
Fayetteville		1.70	1.70	1.70	1.95		1.95	1.95			1.65		1.59		
Mississippi:															
Macon			2.105												
Fresh cream in tank cars, passenger train service (dollars per 40-quarts):															
Michigan:															
Adrian							0.89								
Indiana:															
Bluffton							1.185				1.015				
Frozen cream in 50-pound cans (dollars per 100 pounds):															
Wisconsin:															
Bruce	1.06	1.18		1.30					1.07		1.30			1.27	1.31
Minnesota:															
Minneapolis	1.06	1.18		1.30					1.07		1.30			1.27	1.31
Kansas:															
Ottawa	1.21	1.33		1.43			1.51		1.15		1.39			1.36	1.36
Texas:															
Dallas	1.81	1.94		1.98			2.09		1.75		1.94			1.84	1.85